TYPOLOGY & TECHNOLOGY

OF MEITEI WRITING MATERIALS

(Handmade Paper, Ink & Pen)

B. KULACHANDRA SHARMA

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FORWARD

This study, the "Typology and Technology of the Meitei Writing Materials (Handmade paper, ink and pen)" is put in black and white in the memory of those anonymous workers of this field in the bygone days and the present author of this study is glad to forward this book to all the lovers of the Meitei classic and archaic culture and small scale cottage industries in the memory of those said workers of the yore.

Every nation of the world whether of large or small population are trying to trace out working and labour of past forefathers so as to introduce their identity to the present people of this day. If it be so the Meitei as being a nation or a group of people who had their own script/alphabet and writing entity they used to manufacture their writing materials even if it was in the smallest scale So the present author tries to find out the typology and technology of the Meitei Writing Materials. Any appreciation and depreciation may have been in this study but it must be excused as the present author handed over the charge of further research in this field to researchers of tommorrow as they will have more wider sense of knowledge in this field, scientifically and technologically. The present writer reserved all the rights for the futures researchers and writers in this field but not for those who only talks but doing nothing.

Keeping a humble wish for further studies in the technological field of other subjects, the present writer sincerely forwarded this book under provisions of material culture and cultural materials of olden days of Manipur as expecting any suggestion, correction, etc. with the grace of the culture of Manipur.

Imphal,
the 20th July, 1999 BK. Sharma

CONTENTS

Subjects Pages
1. Introduction
i) Problem of recorded antiquity 4—9
2. Typology & Technology 5—8
i) Brief History of writing, Invention of paper. 8—9
3. Brief history of writing in Meitei Context 10—16
i) Meitei Writing Material Surface 12--13
ii) Introduction of Paper 13—16
4. Typology of Meitei Handmade Paper 16—28
i) Tibeto-Nepalese Paper-Making 21—22
ii) Assamese ,, ,, 22—27
iii) Handmade paper Making Centre 27—28
5. Textural Fabric Material 28—54
i) Basic Base Materials 31 – 35
ii) Catalytic Materials 35—42
iii) Protective Materials 42—47
iv) Adhesive Materials 47—52
v) Implimental Equipments 52—54
6. Technical & Technological procedure of paper-making 54—61
7. Typology & Technology of Meitei Handmade ink 62—111
i) Typology 63—65
ii) Technology 65—66

iii) Oriental style of Ink:making 66–93
iv) Technique & Technology 93–94
v) Western Fashion of Ink-making 94–105
vi) Technique & Technology 105–111
8. Meitei Traditional Writing Instrument 111–123
i) Typology 114–121
ii) Technology 121–123
9. Testification of Durabilities 123–124
10. Conclusion 125
11. References & Resources 126–127

INTRODUCTION

Traditional writing and recording custom.

The required materials of the Meitei writing and recording tradition are produced as the English proverb says, "Necessity is the mother of invention." Its handmade paper and ink are still in use in among the traditional places and scholars in Manipur as it were done in among the neighbouring tribes, races and nations as well as the far and near neighbourly nations or elsewhomsoever nations who have writing writers' or recording recorders' record-keeping tradition and custom. The Meiteis, as they belonged and belongs to chronicle writing and annals recording nations of the world they made and fabricated the essential needs of writing i.e. the writing surface/sheet, the writers' instrument/weapon/equiptment and the recording colour/liquid to feed their desire and aspiration.

The Meiteis have their own traditional methods of making/fabricating handmade paper for writing sheet, designing floral crude pen for writers' instrument and indigenous ink recording colour-liquid. The Meitei tradition of classic writing in ethical and literary trends and

The Meitei writing/recording tradition and their products.

customary recording of ethnic clannical and family genealogies (Sagei-Salairol. Meihoubarol Sagei Puyas i. e. scriptures of clannial and family genealogies and accounts) are still in currency. with about 2000-4000 Meitei scriptures with their various unaccountable copies in the Meitei native script and about 1000-2000 transliterated, transcreated and transcripted Hindu religious literacy books/ scriptures with their different copies in Bengali-Assamese script were written prior to the advance of the British paramouncy or colonial period in Manipur even when Machine-manufactured paper were abundantly imported from the British father country via their colonial territory, India.

The problem of recorded antiquity of the traditional writing materials

The Meitei have inherited their written literature on various fields of the classical culture for both arts and science. But no written antiquity on the technology and typology of the Meitei traditional writing materials have not yet been carried out even though the tradition is carried down from generation to generation. To this day nobody cares for the awareness of it, nay to study on the tradition is appeared to have been happened as a taboo to the Meitei society as modern machine-made paper sways over every pros and cons of the society. The traditional technology of the writing materials regarding the technical and mechanical arts are not yet still died out. Some traditional scholars are in rescue and relief but no rehabilation of the customary heritage. They do not find any documentary record but verbal and oral deliveries of their teachers who procured the information as the present traditional scholar do and they, while themselves are transforming the oral information into the work-process, progress and programmes, as the experts and skill workers of the craft never make a current write-up to this effect. No governmental personnel nor public social worker who love the country most is looking upon this piece of traditional craft, once served their beloved mother country, because their/his need are responded by the imports. Thus This traditional art or craft become today a void and voidable custom of yore, interested by none for its value as an craft of antiquity.

Not yet in extinction of the technical & mechanical arts

An art or craft of today, interested by none for its write-up in its antiquity.

Every ethnic group and its people are trying to fine out their traditions and customs to multiply to reform their cultural heritage so as to refine and acertain their ethnic identity. So it is high time when the craft is still in its vitality to add every pieces of cultural antiquity whether folklore or modernlore for building up the tower of cultural heritage as it is the mirror and the index of the racial or national identity. So to solve the problem of non-availibility of written records or current write-up from the oral preservations of the elders, the responsibility and duty subject to the citizen of Manipur with knowing nothing of the technology and typology of the Meitei traditional writing materials, is undertaken to study,

Aim and objective to solve the problem.

THE TYPOLOGY & TECHNOLOGY OF MEITEI TRADITIONAL WRITING MATERIALS

To study the matters as prescribed by the heading in its full denotation is a hard work. So a gist sum-up process is taken up under this heading. The Meitei traditional writing materials as described above are taking up one after another by starting from the handmade paper, then the native ink and lastly the floral pen.

THE TYPOLOGY AND TECHNOLCGY OF MEITEI HANDMADE PAPER TRADITION

As the paper is the need of writing it has close relation and correspondence with writing with special and specific reference to its evolution and origin in course of the progress of writing. So to look upon the writing with its evolution and progress are interesting in finding out the origination and introduction of paper so as to acertain the typology of the Meitei handmade paper. Even though the paper is the most favourite writing materials, the need of writing surfaces/sheets/materials prior to the invention of paper are also worth to mention as they were subsituted by paper. So to study a brief history of writing is essential as the background history which is presented as under :—

BRIEF HISTORY OF WRITING : IN UNIVERSAL CCNTEX

Writing was started universally by C. 5500 years B. P. It is answered by the quotation - "The oldest known writing in world is on a tablet of solid limestone found in the ancient Sumerian city of Kish in Mesopotamia, the land between the two Rivers ... ... Some 5500 years ago a scribe carved into it the outline of a foot, a hand and a sledge with other marks beside them probably representing numbers," (Readers Digest Assn., 1974, 302). As aforesaid writing has its needs and the needs/materials have their own conventional histories in collaboration with the progress of the art. Regarding these histories which provide the changes of the writing surfaces/ materials of displaying the written matters so far known upto the stage of the first writing the surface and its texture were on the surface of a tablet and the solid limestone. This was followed by a tablet of clay which was afterward baked in the sun to harden them at C. 5100 years B. P. (Ibid). The technique and style employed in both the cases were scribing scratching/ cutting by the point of a scriber or scribe-pen i. e. reed pen (a piece of reed plant with one pointed end).

The first writing in the world and its material and followed up changes in writing materials

The above writings were changed to write on a new surface of writing. This surface material is known as papyrus plant during the period from 5000 B.P. to 2700 B.P. (Ibid. 303). The papyrus or paper-reed (Cyperus papyrus or kindred species) is a tall plant of sedge family, once common in Egypt. The pith of this reed was

papyrus or paper-reed

Surface of pots and metal-surfaces writingw

Colour juice using for the first time as ink.

writing on bone

cut in thin strip and pressed together as a sheet (Catherine schwarz, George Davison. Anne Seaton & Virginia Tebbit, 1990, 1044). Not only the writings on papyrus made sheets, the writing on the surfaces of stones, rocks, metals and on outer surface of pots were also flourished during the period mentioned above (Ibid). By this time, writing by twig-pen with the colour juices/fluids extracted from the floral material as ink was started for the first time. From above uses of the colours as the writing materials it is conceived that the people had the idea of dying prior to it but the actuality of the fact is to be acertained by further supports of more facts and finds with this regards. Then, within this period of progress the Chinese introduced writings on the elongated bone of their founal remains in China by c. 3400 B. P, and further proceeded to start writings on the strips of wood and bamboo (Ibid, 3o3).

The art of writing was thus spreaded and propagated through out the surface of this globe The writing on the surface of indigenous and metamorphic rock of the hills, mountains, caves and rock-shelters, stones and megaliths, smoothened barks, strips of board and plank of wood and bamboos, pots and potsherds, hides and skins, leathers, silk cloths, papyrus-pieces palm-leaves, etc. were proceeded from 5000 B.P. to 1500 B.P. (Ibid, 303). The writing instruments during the period were reed-pen, bamboo and twig-pens as well as twig and bamboo-strip pens and the colours/inks of various mixtures and compounds at different quantities of the floral plant-juices, founal-animal-remains and soil-rock and mineral resource eliments and the compounds

INVENTION OF PAPER AND ITS SPREAD

Paper the best, most suitable, familiar and favourite surface/sheet for writing was invented by the people of eastern Asia for the first time in China. The date of invention of the material, as claimed by the Chinese is in the first century A. D. (F, Korovkin, 1981. 100) which is happened to be in 105 A. D. (Readers Digest Assn. 1974, 172). But the internationalised conventional date stands on 751 A. D. (Ibid, 172). The paper then made by the Chinese was the product of the mixture of various floral textural fabrics. The textures, as provided, were rags,

Date of invention of the first paper by the Chinese

barks and bamboos (F. Korovkin, 1981. 100). But in due course of the handmade paper producing and processing the textural fabrics are liable to increase with seasonal floral leaves and stems of various plants, grasses etc, soft twigs and branches of young plants and woven old threads of unused nets, mates etc. (Ibid.).

Textural fabrics of Chinese paper.

Spread of the craft of the paper making

No other nation/race/tribe could get the knowledge of the art and craft of paper making by time when the Chinese were enjoying the fruit of their invention. But some Chinese paper-makers were captured by the Arabs at a battle in central Asia. They, the Chinese prisioner were brought to Arab and they were made to make papers in Arab. Thus the Arabian got the secret of paper making craft and become the second country of the handmade paper-making home (Readers Digest Assn, 1974, 172). From them the knowledge of the art was spreaded to all the countries on her west and its spread got some rooms towards her east. Thus this globe was made the world of paper by these two countries in the span of time with civilization of medieval Historical period of the world.

Arabian paper-making, writing material tradition.

BRIEF HISTORY OF WRITING : IN MEITEI CONTEXT.

The writing history in the context of the Meitei was started in/about the fifteenth century A. D. as provided by the Meitei literary wources (Nongpok haramlon script, Sorarel Macha Khun kumba script M. Ss.) The couses of the late beginning are/were subjected to her geographical reasons, such as topographical disadvantage, transport difficulties, habitational unfavourableness in the valley area due to its submerge conditions in the rainy season, etc.

Even though Indian people got the knowledge of writing in about 2543 B.P. with her Brahmi script (Hassan Dani, 1963, 2) and in/about 4000 to 3000 B.P. with her Indus script, they had little touch and contact with the people of Manipur prior to the 15th century A. D. as evidented by the most authenticated and authritative Meitei scripture (Ibungohal & Khelchandra, 1989, 1–20) even when some illiterate immigrants of fisherman (Dumbs i. e. Kalicha/Kalisha) and some one or two families of akin clans/tribes had encroached in the territorial jurisdiction of the then natural hill fort of Manipur. So the writing is appeared to enter in Manipur when the Meitei - lord Kiyamba (1467-1508 A.D.) had cultural and ethnological exchanges with the king of Pong [King Chouphakhe Khomba i. e.

Starting of the writing and recording tradition of the Meiteis in the 15th cent. A.D.

Sao-Nga Pha/Pa (1432-50A.D.] of pong Kingdom (Tai-Mao or Mao-Shan kingdom capitalised at present Mogaung town of Mogaung district of Kachin state of Myanmar /Burma) in 1470 A. D. (Ibid, 19-20 , Soraren Macha Khunkumba script, Nongpok Haramlon script, etc. M. Ss). In this occasion of exchange the Mao-Shan king imparted one literate person, name Loutaseng to the Meitei king for serving the Meitei king in the service of record-keeping and other writing businesses (Ibid, Ibid). No record, written or unwritten is yet available uptil now with this regard. From this fact it is observed that the Shan literate, Loutaseng was liable to write in the Shan script.

The western literate person of Bengali Roy clan on sub-clan migrated after 44 years of the event of Meitei - Mao-Shan cultural and ethnological exchanges i. e. in 1514 A. D. Ibungohal & Khelchandra, 1989, 22) In this context the Bengali literate Gabichandra/Kabichandra was liable to use the indigeneous Bengali script which was just born by North eastern Brahmi family script (Hassan Dani, 1963, 136) along with the Brahmi itself. As there was no conventional script in Manipur uptil the regime of Meitei-lord His Divinity Khagemba (1597-1652 A.D.), the fountain of all cultures (political, social, economical, etc .) convened all the scholars related to the literate, learned scholars of his time and introduced a conventional Meitei script by 1616 A. D. (Ibid, 36). Thus the problem of writing was improved and traditional recording of the Royal Chronicle was proceeded in the native national script.

MEITEI SCRIPT

MEITEI WRITING MATERIAL SURFACE

The art of writing as withnessed by the Meitei scriptures referred above and as told in the previous paras of preceding heading is appeared to have started in Shan script and followed by the Brahmi-Bengali or indigenous Bengali scripts at different angles in the 15th and 16th centuries respectively in the horizon of socio-cultural atmosphere of Manipur. The art was brought in Manipur by the eastern and western immigrants.

Meitei writing sheets prior to the use of paper.

Even though the actual writing sheet or surface material prior to the production of paper by the then people of Manipur cannot be find out due to unability of relative referential literary document or archaeological finding it is confirmed that if there was writing then there were writing surfaces/sheets. These can be traced out with comparative referential calculation of studies like the nature, native state ethnic origin, cultural literary heritage etc. and the materials most favourably using in the neighbouring areas and neighbours. From these studies it is automatically sprung up that the writing materials will be - the leaves of the palm tree (a Sp of palmal family) or shrub, its akin or kindred plants of same genus/family, streeps of bamboo, wooden board or plank (Agarbak), pieces of cloths, hides and skins or leather.

INTRODUCTION OF PAPER AND ITS NOMENCLATURE IN MANIPUR.

As the world approved and agreed to the spread of the knowledge of the Chinese secret art of paper-making craft and technology of the art of manufacture to Arab first and then to world, the craft of the Chinese paper-making tradition encroached in Manipur by crossing her eastern frontier hills and mountainous region directly through the Chinese merchants who had visited Manipur frequently by that time for trading purposes. They are probable to enter Manipur through the Kondong/Konthong (Gateway of village means Gateway of Manipur)

Gateway or Khoibu/Khoiphu (the hive of bees) Gateway via Shan state of Northern Myanmar as the route was opened by the two remarkable generals – General Twan and General Prince Fun-cia of Chao-Meng-Wang Ko-lo-feng (754 A.D.) of Nan-chao empire of Yun-nan, China in the 8th century A. D. (P. Gogoi, 1968, 68-9). The Chinese merchants were presumed to have been brought the paper as merchandise or trading goods to Manipur. When they were in Manipur they had taught the art of making the paper in their own technology and style of making it (T. C. Hodson, 1981.) The Meitei learnt the technology of the typology of the Chinese handmade paper making tradition, But after/about the same time the then Manipuri Muslims who had just migrated from Bengal as a result of extending their helping hand in the assistance of the Dimacha/Kachhari king for invasion of Manipur in 1606 A. D. They were captivated by the Meitei and made them to settle in the valley of Manipur. After some time or more later the Muslim introduced the Bengali technology of making handmade paper. But they could not compete and

First handmade paper in Manipur in Chinese Technology.

Second handmade paper in Manipur in Bengali Technology

contest the trade/market facility of the products of the handmade paper of the Chinese technology So, they had given up the business/profession in due course of paper-making tradition of Manipur.

The Meitei uses the nomenclature of "CHE" as the equivalent word of paper. As the linguistic property of the "Meiteilon" or Manipuri language provided, all the words belonging to the native original tongue/language are to bear/have three properties, i. e. the meaning, the cannotation and the denotation. Any word which does not possesses these three properties completely/fully the word is generally/formally belongs to the loan-word or borrowing word. Regarding the matter of the so called Meitei word, "CHE", the meaning is "paper" means; a writing material sheet on which writing is to be done with, the denotation and cannotation are not responded in relation to and collaborated with the nomenclature.

Hence, the Meitei local word "CHE" is not a Meitei native original word and it is a loan-word or borrowing word i. e. this word was not evoluted etymologically or developed through the linguistic need or call of the Meitei tongue. It is a foreign word, seems to be borrowed from a Chinese word of the same meaning, nomenclature etc., probably, a Tai linguistic products (Yuen Ren Chao, 1970.) of China.

Another synonym word to mean for Che/paper.

MEITEI CHE

The synonym of the word "CHE" in original Meitei tongue is appeared to be the compound word KHORBAK (KHORI+BAK/PAK =KHORI +MAPAK = Khoriba/Khorinaba Mapak, means writing broad-sheet i. e. broad-sheet for writing, in short, writing sheet/surface) but it is corruptedly pronounced or corruptly call as KHORBAK" , as the Meitei are/were habituated in harsh sounds for soft sounds. The handmade paper as it were made locally, by native people/scholar it is called by its younger generation of 20th century as 'MEITEI CHE' so as to differentiate and to denote in quick understanding from among overfloating the modern machine-manufacturing papers.

TYPOLOGY OF MEITEI HANDMADE PAPER

The Meitei, prior the Anglo-Manipuri war of 1891, made enough quantity of paper to meet their peoples, need which was happened to require it from time to time for personal, public or state uses. The inhabitants of Manipur as being the men of record-keeping as all their neighbours (i) The Ahoms (Buranji), (ii) the Dima-cha/sa or Kachhari (Buranji/Itibrita), (iii) The Tripuri (Rajmala), (iv) The Awa /Burmese/Myamma/ Mramma (Maharajanwen) and Shan States of upper Burma/Myanmar have recorced or written up their royal chronicles and anals in upto-date position. For this record keeping by working at their then Governmental offices for the state duty in general need papers to write. So they take up the craft of handmade paper-making from about the commencement of the second decade of the 17th Century A. D. (C. K. 1989, 36)

Record-keeping tradition of neighbouring peoples

The craft of paper-making was introduced in Manipur as cited above, by learning the technology of the craft and imitating what the Chinese people had done. The probable date of the introduction of the Meitei paper-making tradition lies between 380 B. P. to 394 B. P. (i. e. from 1616 to 1602 A. D. s). But further minute study in this regard may effect the date. The true and correct state of affairs of the typology of the Meitei paper-making tradition is appeared to be the typology of the

Date of introduction of Meitei Paper-Making tradition.

oriental toadition subject to the available floral founal, minerals, etc., soil and rock types. Again the similiarity is liable to the fact of spread of the knowledge and technology by the Chinese merchants who roamed over the countries of South-east -Asia by carrying their merceandizes during different periods of the history of South-east Asia (T. C. Hodson, 1981) and so the oriental peoples were also taught by the Chinese merchants and the people of the South-east Asiatic countries were sure to learn the skill and technology from the Chinese. Therefore the similarity in the typology is under universal general rule of "students of same teacher have the same lessons."

Actual typology of the Meitei paper-making tradition,

The Manipuri Muslims, as aforesaid, who had migrated from Bengal (East Bengal or the present Bangla Desh) in 1606 A. D. had introduced another technological typology in Manipur. This typology of the craft with which they shared the state economic condition of the than kingdom of Manipur the Bengal typological handmade paper-making tradition. They had eye-witnessed or personally under went into the work when they were in their native country. The Bengal typology,

Died-out Bengal Paper-making tradition introduced by Manipuri Muslims.

they took up was the one which hade its base area at Silhet/Sharihatta/Shristta. The paper-maker of the Muslims who were the Islamic religious group, known to the Meitei as Pangal, a corrupted from of Bengal (the people of Bangala/Bangla or Bengal) in imitation to the Assamese/Ahomese/Ahom dialect denoting the Bengalis, had/has a family under the surname or family-name or CHESHAM/CHESAM (CHE+SA+M =CHE+SABAM=CHE+SABA+MAPHAM/MAYUM, in transliteration, -CHE=Paper, SABA= make, MAPHAM= place or MAYUM=house /home or household or family— in transcreation, — the family of paper-maker or paper-maker/making family or the house/home where the paper-maker lives). As the Chesam family of the Meitei who were either Meitei indigenous religious faith follower or the Hinduism religious creed follower was/is in extinction, the Muslim family is the still standing or in existence for a specimen/sample of the prototype of paper-making workor paper-makers community, bearing the same surname by its family-men to exhibit the traditional antiquity of paper-making profession/business. But the typology of the

CHESAM, the Muslim family of Bengal typology paper-maker.

Bengal paper-making tradition/ technology was died out as defeated by the typology of the Chinese paper-making tradition/technology in due course of the market facility compitition or contest while the family-name and family-men are in existance but vice-versa or the reverse was/is happened in case of the Meitei family. To find out the actual date of the Muslim workers' working period/time in the state/kingdom's economy is still in obscurity at this level of facts and finds.

Bengal/Bangalee paper making tradition.

The Bengali/Bengalee or Silhetiya paper-making tradition of Bangla Desh or Bengal was/is corresponded to the Tibeto-Nepalese paper-making tradition (Masatcshi A. Konishi. 1979, 203 in T. C. Sharma & D. N. Majumdar, 1979) which was again descended to the Assamese/Ahom paper-making tradition from its subtradition of the Nepalese tradition (Ibid, 203-04). The gists of the typological and technical accounts of both the traditions are in presentation as under for ready reference to the present study of the Typology and technology of the Meitei paper-making tradition :-

1) TIBETO-NEPALESE PAPER-MAKING TRADITION.

Typology

"Bengal is an important region in that other traditions could have also met with. The major non-Western tradition of paper-making is the "Tibeto-Nepalese" though the tradition may be further sub-divided into the Tibetan (Bhutan, Sikkim, etc.) and the Nepalese" (Ibid, 203).

Technology

It is a quotation from the reknown paper technology professor Masatoshi A. Konishi, Hosei University, Tokyo Japan. And the learned Professor proceeds to the technological aspect of the typology as "... ... ... they are essentially same in the technique, espicially in the use of inner bark of the tree as the chief material, normally Daphne cannabina or D. papyrifera and also in some of the main parts of the technology like pouring the ready pulp over the lifting mat, lifting and drying the sheet as it is without peeling off the paper while it is still wet." (Ibid).

This account of the learned professor Konishi will be satisfied if any one who studies has gone through the technological aspects of other tradition or of any particular process and proceeding of technical and technological accounts of other sub-tradition of this family. He then proceeds further to those traditions which have similar employments/utilities of row-materials but having the likely differed technical and technological aspects. He mentioned of the Southern India with special reference to the Western Ghats and Nilgiri regions. There the material tree-bark spicies is called Rameta (Lasiosiphod erisephalus or of the Thymelaeale family) locally. This plant sps. had been long used by the Adivasis of the region as an intoxicant for the catch in case of fishing. The similar descended areas of Tibeto - Nepalese tradition, as he pointed out Kalimpong, the lower Brahmaputra - Gengetic plain and certain parrs of U. P. (Satgadh in Pethoragach District). Daphne (locally called lokta or argeli) is only available in the region above 5000/6000 feet.

2) ASSAMESE/AHOM PAPER-MAKING TRADITION.

The Ahom, a Mao-Shan immigrant tribe from Mung-ring Mung-rang in 1228 A. D. self - styled themselves as Tai-Ahom or Ahom Tai with calling themselves " Tai " out of the Tai traditional cultural heritage of the Tai race/

groups/ sections, custom of calling themselves "Tai" and claims themselves to be the Tai racial group. They are better to call themselves "Shan" because the Shans are no doubt the Tais whose cultures were filtered/ and sifted sieved through Budhism or others in the land/states of upper/northern Burma/Myanmar. The paper making tradition of the Assamese/Ahom or elsewhom ethnic group of present Assam state of Indian Udion was a distinct sub-tradition of the Nepalese paper making tradition, the sub-division of the Tibeto-Nepalese paper making tradition just described above. But it is observed by learned Professor Konishi that it is not yet in certainty of his study with regards to the independent characteristics of the Assamese traditien from that of the Tibeto-Nepalese tradition.

The Shan-Ahom or Ahom-Shan.

Typology

The technological aspect of the Assamese paper-making tradition is to be described from the extract of study - report of the above introduced learned Professcr. The extract goes as belows : –

"It is well known that the ancient Ahom rulers used Sancipat to record their chronicles

Material texture

Technology

(Buranji) but to translate Sancipat as "bark -paper " is quite misleading. It is softened and beaten bark of sanchi tree (Aguilaria agallocha) and not paper in strict sense. But going further east in tracing their origin, we naturally come across the old paper-making tradition of the Thai-Burmese people like Thai-Khamti, Aiton Phake Turung, Nora, Khamyng, etc. who come to Assam as late as 18 c. (18th cent. A. D.). They seem to have made paper from a kind od creeper called Hai or thao-che (paper creeper). The material is cleaned and cut into pieces, then pounded and boiled with some alkaline liquid (Nam-thao) prepared from ash, and the ready pulp (nu) is poured on the lifting frame (Khop) through cotten sieve (Pha). The whole frame is laid on a wide wooden plank (Pen) , not in a water tank as in the Tibeto-Nepalese tradition, and the pulp is further gently spread by a square wooden roller (Mai-phe-che). The paper is dried on the frame in the shade. Fire is not used for the drying as in the Tibeto-Nepalese tradition. polishing is done just before the paper is dry with the help of a round wooden roller (Mai-thu). — (Ibid, 204).

Sample of Meitei Handmade Paper

Meitei handmade paper has not texual reference in the Meitei scriptures and this accounts of the paper making is appeared to have verbal mention of accounts of process and procedure on the workers' or makers' statement of propagation to their desciples and students for performences and employments of the work in paper making to carry out or down the work programme of the craft. It seems to conceal the knowledge of the technology of craft with tight secrecy because of competative native workmanship and business operation so as not to make paper by all but for some specialised persons or families. The accounts of the Meitei writing materials is given by a modern scholar under the heading of LAIRIK INABA MACHAK (N. Khelchandra, 1969, 27 - 32). means writing materials or Materials for writing. In this short acconnt the learned scholar Khelchandra, Ningthoukhongja mentions —

Transcreation Of The Related Statements

The writing materials employing and not ceasing from employment in that purpose are the Agarbak (strip or pieces of wooden board) and Meitei Che (Meitei/Manipuri paper i. e. Handmade paper) in Manipur.

Writing paper is also made more than the Board-pieces/strips in Manipur. Some people are making paper at present for writing the Meitei scriptures. The Meitei Che or Meitei handmade paper is somewhat in thickness. It is rubbed off with Kangkhil (fruit-seed of Entada phaseoloides, fem, Leguminosae).

It is a hard work to award a date, how long the Agarbak and the Meitei paper are in uses in writing in this land (Ibid, 27).

From the above write-up of respectable N. Khelchandra (Ibid, 27-32) it is brought to light that the Meitei handmade paper alongwith Agarbak, Kona - mana (Palm leave : Species of Palmae femily), Tenou mana (Leave of Euphorbia antiquorum & E. nerifolia, fem, Euphorbiaceae) etc. But the paper is the largest quantity in the use of writing materials.

There is plenty of evidence of Meitei hand made paper uses. Many manuscription handmade paper are to be available in Manipur State Archieves, Manipur state Museum, Peoples Museum, Kakching, Manipur State Kala Academy and in the private custodies of reknown scholars, viz, Sharva Shri, N. Khelchandra, Uripok, Ng. Kulachandra, Lamsang Akham Leikai, N. Ibochouba, Haobam Marak, M. Narendra, Khongman. S. Kondumba Sallungpham

Ch. Hemchandra Khaba Naoremthong, N. Indramani, Takyen Khongban, Dr. Suresh L. , Kwakeithel, etc. These paper manuscripts are of after 18th centuries. But the art of writing of hand made paper for the Meitei scriptures was introduced during regime of Meitei-lord His Divinity Khagemba after 1616 A. D. , probabely after some one decade of this date.

HANDMADE PAPER MAKING CENTRE.

As the art of writing is confined to the academic and intellactual scholars who are included in among the man of latters. The daily transection of writing as it were done at the capital complex of Manipur under the supervisions of Lai-rikyengba Hanjaba (Masin script. M. S.) upto the regime of Laiyingthou Tubi Charairongba (His Divinity Charairongba, the giver or presiding lord of stream of life, 1697-1709 A. D.) and Pandit Achouba upto the regime of Raja Kulandradhwaja (1890 - 91 A. D.) was effected at the office of the Head of writers and readers (Lairikyengba and the Head of the scholars (Pundits/Maichou-s) . So it is observed that the paper making centre was situated near/in the capital complex where the royal palace compound was also included in the complex. But it is telling against the private paper-making centres of interested scholars or skill workers whose homes were situated at a bit far off places or areas from the capital complex.

As it were not any mention, regarding the supply of paper in the division of labours of family or others professional labours and in the provision of the attending and undertaking state duty and service of the then kingdom of Manipur (Sang Panba Pumnan akki Masin Script, Tampakloi Masin script and Masin script, M. Ss.) it is further observed that the paper making centres were lying mainly within the encloser of the Imphal urban area (Imphal Kangiei or Kanglei Leikai Mari) even though some one or two were lying in the rural areas of the then Manipur.

TEXTURAL FABRIC MATERIAL

Nomenclature of Meitei paper Making.

The Meitei/Manipuri call the art of hand-made paper making as "CHE HAIBA (HEIBA)" in archaic classical style, meaning "mounding (some senses of founding also inhered) the paper and CHE SABA/SHABA in medival and modern fashion, meaning, "making the paper" or "paper-making." Even though the Meitei art and craft of paper-making is the remain/meminiscence of the imitation of the Chinese art of paper-making tradition of China, the textural fabric materials used/use by the Meitei in making their own local and native product of hardmade paper are depended upon floral resources of seasonal and semi-evergreen plants and trees of their native country.

Similarities with the Burmese materials.

Similarities with other peoples, traditional materials & techniques

The textural fabric material of the Meitei has much similarities, sometimes and in some cases of the base or basic materials are of the same species with the Burmese Myamma as both their countries are adjacent to each other. The Burmese account of the materials have not yet found separately but in mixed accounts along with their technical and technological accounts. The Meitei technique and technology of the paper making are also appeared to have much similarities with those of Myamma as both the traditions are belonging to the same catagory of oriental paper making tradition in respect of the typology. As the Burmese accounts of materials and technology found inthe some accounts of Burmese tradition of making the Pa-ra-baik. The employing technique, style and matetials of the craft have the same flows in among the peoples of the adjoining lands such as, the Shans. the Burmese, the Meitei, the Kachin, the Karan, etc. with little local variations of the additions and omissions of materials and processing procedure and items as provided and sustained by the environmental and ecological conditions effected and caused by climatic exposure of the countries or localities. A typical example the account of the craft for oriental countries /peoples of south-east Asia is deplaying hereunder as found in the above cited Pa-ra-baik (Handmade writing paper) making tradition.

Pa-ra baik (Hand-made paper) making tradition of Myanmar/Burma.

“Writing paper is now very generally used but it has not completely driven out the Pa-ra-baik which is still employed in many places for memoranda and accounts and as the writing can be rubbed out, it will for many years to come remain in use as slates in Europe ... .
It is made principally at Nwa-ma-ran, a village between Prome and Swedaung, and either of the bark of the Ma-Waing tree (Broussonettia papyrifera) or the inside of tender bamboos. In either cases the substance is pounded into a pulp with water and with half its weight of lime and with a sufficiency of water is boiled until nearly all the water has evaporated and the pulp will crumble between finger and thumb. It is then again pounded, boiled water being added if necessary, and put into frames of required size and put it in the

sun to dry. The edges are trimmed and both sides of what is now a sheet of grey, somewhat limp and very tough kind of card-board about 1/16 (one sixteenth) of an inch thick, are coated with a mixture composed of finey-powdered charcoal boiled with rice-water or with glue made from hides; this is burnished with a smooth piece of bone and the Pa-ra-baik is folded up such as a map often is. — (Compiled by Authority, 1987, 420-21).

From the account both the textural fabric materials and technological process and procedure of the Burmese tradition of paper-making is seen vividly.

Division of the Meitei textural fabric materials

The Meitei textural fabric materials can be divided into four groups according to the functions and duties the materials have undertaken during the process of undergoing changes by the whole materials in transforming into the paper. They are — (i) Basic base materials (ii) Catalytic materials or Catalysts, (iii) Protective materials and (iv) Adhesive materials. The accounts of these materials are describing separately as belows :

1) BASIC BASE MATERIALS

The basic base materials of Meitei paper-making tradition are all floral produces and their unlived remains. They are :–

i. Leaves of seasonal and semi-evergreen plants including trees, shrubs and herbs.

ii. Buds and leaves, seasonal grasses and soft and young stems, twigs etc. of grasses, shurbs and herbs.

iii. Young and soft stems of bamboos.

iv. Rags, and remnants and remains of frayed cloths, tattered cloths and old unused clothes.

v. Thrown out pieces of paper (This material is liable to be in use in due course or later period) .

The above material are used but have the more aspired and dear/costly kinds/spicies according to the qualities of the produced products The Meiteis have their full faith and trust in a kind/species of plant under the local name SU/SHU for its production of superior quality of paper which has the longest durability in among the Meitei paper produced by other materials. The plant SU/SHU is nothing other than the universally popular "PAPER MULBERRY TREE with its Bota-

SUSHU PMBI or Paper Mulberry Tree. (Broussonetia papyrifera)

nical name of Broussonettia papryfera (fem, Moraceae.).

i) Paper mulberry tree— A tree of Eastern Asia and Polynesia of the mulberry femily whose inner bark yields tapa cloth and paper-making material — (Catherine Schwarz, George Davision & others, 1990, 1043).

ii) Paper mulberry : Broussonettia paprifera (Moraceae); small quick growing tree. native of China and Japan : fibre obtained from bark used for making paper (P. K. Garg & K. P. Srivastava, 1994, 293).

KABRANGCHAK
(Morus alba)

Next to this floral plant paper mulberry tree the Meitei regards another tree/shrub under the local name of KABRANGCHAK [KABO LANGCHAK/MACHAK (Kabogi Langgi Machak; Kabo lang thokhanba teengi Machinjak ; the leave of which (mulberry) is fed for production of Kabo Lang, the thread of the Shans i. e. the Shans yarn; the Silk] : Morus alba (fem. Moraceae) . This plant produced at least medium quality paper.

Handmade papers of good quality are also made from the young and soft stem of the bamboos. Among the bamboos the important genuses for making paper are — i. Bambusa, ii) Dendro calamus and iii) Melocannabam. The bamboo is called Wa, in Meitei local tongue and many species are found in Manipur. There local names are — i) SHANEIBI, ii) WUTANG/UTANG, iii) WUI/UI, iv) WUNAL/UNAL, v) WUNAP/UNAP, vi) WUMU/UMU, vii) MARIBOP, viii) MOUBI, ix) WATANGKHOI x) WANAN, xi) KHOK etc. Among these bamboos Saneibi (Bambusa anundinaceae, fem, Gramineae), Utang (Bambusa tulda, fem Gramineae) and Moubi (Molocannabam busoides, fem. Gramineae) are common and they are favourable and familiar for making paper because they are available in cheap and in abundance in Manipur valley.

Wa (Bamboo)
Bambusa Sps.

Others plants
with rags.

For inferior quality-paper the bark of trees, young stems. branches, twigs, buds and leaves of various plants — trees, shrubs, herbs reeds, grasses, weeds, etc. are used. These materials are to be mixed up with rags, unused old cloths and clothes so as to flavour with fiberous materials in the texture.

2) CATALYTIC MATERIALS OR CATALYSTS

The catalytic materials or catalysts are auxilary or helping materials to gear up the process and progress of reformation. The definition of catalyst as provided by Chemistry — Catalyst : A substance that alters the rate of a chemical reaction without itself being changed chemically in the reaction ... ... The function of a catalyst is to provide a new pathway for which the rate-determining step has a lower activation energy than in the uncatalysed reaction. A catalyst does not changed the products in an equilibrium reaction and their concentration is identical to that in the uncatalysed reaction ... ... The catalyst simply increased the rate at which equilibrium is attained. (John Daintith, 1983, 42)

Mechanism of the catalytic substances.

The catalytic materials employed in the art of making the Meitei/Manipuri handmade paper are the substances to act as the catalysts in the process and progress of decaying and rottening/putrefying the floral basic base materials. By this rottening process will decompose and disintegrate the components and constituents of the organic body of the floral plant material into its organic parts and substances. These catalysts further separate/resolve/decomposed the components and constituents into the stage of element and then to the molecules of the organic substances. These elements and molecules are in suspension state in the liquid or the solution of Alkali or alkaline ash-water treated or added for soaking the compact pieces of the cut or uncut parts of the raw plant bodies without effecting /affecting the alkali or alkaline solution.

Alkali : A water-soluble strong base, strickly the terms refers to the hydroxides of the alkali metals [Lithium (Li), Sodium (Na), Potassium (k), Rubidium (Rb), Caesium (Cs) and Francium (Fr) : A group of soft rective metals] only but in common uses it refers to any soluble base (a compound that releases hydroxyl ions, OH in aqueous solution) – (Ibid, 6, 22)

The employing Substances and Floral Materials

Substance in employment.

The employing substances use by the Meitei as the Catalytic materials in their paper-making tradition are appeared to be the alkalies. For the purpose they utilise the alkali saucers, balls, grains and liquids/solutions produced in their rock-salt extracting/manufacturing worksheds of various rock-salt springs of Manipur (most popular of them are — Waikhong, Chandrakhong, Ningel, etc. But the Meitei prefer to employ the personal/private home/domestic made ash-alkaline fluid/water or alkali solution by extracting themselve in private economy. The ash-alkaline solution is extracted from the plant-ash or vegetable-ash in the solvent of water. Therefore, these alkalies are nothing other than the Alkaloids which is stated as ... ...

Alkaloid, the catalyst.

Alkaloid : A group of basic organic substances of plant origin containing at least one nitrogen atom in a ring structure in the molecule. (Alan Isaac & E. B. Uvarov. 1981. 11)

UTI/UTTI, Solution of Vegetable-ash -Water.

The alkaloid are called by the Meiteis as UTTI/UTI (UT = ash, ti/di (bodo dialect) = Water : the water/liquid/solvent is treated with solute/vegetable - ash to form fluid/solution of ash -water) in their local tongue as well as the curry which if flavoured by these alkaloids. These alkaloids as defined by the above definition are the products of vegetable/plants. The selected plants for the best qualitative solvation of Uti/alkaloid as offered by the flora of Manipur are — i) KHUTCHUM/ KHUJUM PERE (Achyranthus aspera, fem,

Plants/Vegetables for extraction of Alkaloids

Amaranthaceae), the best for its property and quality in the utility for rottening power/element, ii) CHANGBI LAPHU (Coarse class Banana or Plantain Tree : Musa paradisiaca, fem. Scitaminaceae), iii) HEI LAPHU (General class or common Banana or Plantain plant/tree : Musa sapientum, sub-fem. Scitaminaceae), iv) Various species of garden and field peas, beans & grams specially — a) HAWAI THARAK or MANGAL HAWAI (General common garden pea : Pisum sativum, fem. Papilionaceae), b) SAGOL HAWAI (Black gram or Cow pea : Vigina sinesis, Gymnema lactiferum, V. caljang, etc. fem. Leguminoceae), c) NUNG HAWAI (Soya bean : Glycine max, fem. Leguminoceae), d) PANGKHOK (Arum plants of both edible and unedible roots : Species of Araceae femily), e) HONGNGU (Species of genus Alocasia of Araceae femily f) I (Thatch : Saccharum sponteinium, fem. Gramineae), and g) CHARU (Straw ; Stem of Oryza sativa, fem. Poaceae) . The later eight plants are of the properties and qualities of medium standard and general uses. These plants are not so hard stems and big as the trees. And so they have soft stems, branches, buds and leaves which are their parts of utilities.

Process and procedures of preparation for Alkaloid solution from vegetable -ash and - water.

Typology

The process and procedures for solvation of the vegetable ash-alkoloid solutions in water, for this purpose, undertaken by the Meitei is the simple process of filtration of the solvent/water through a filter/sieve/sifter of plant-ash to find a fluid/filtrate/solution of dissolved ash-alkali or alkaline substances in the vegetable-ash. The undergoing procedures go as under :—

UTTI CHUMBA/ LOUBA (Procedures for solvation of vegetable -ash solution.

The selected, taken or availed plant/vegetable, whether seasonal or unseasonal is to be dried throughly and entirely as a whole or by its enlongated parts in the sun so that the dried plant may be enabled to burn completely so as to obtain good quality of ash. Firing or burning of the plant or ite stripped/separated/cut parts is done by the Meiteis in the open-burn or bonfire style. The firing/burning is to be looked after for good result/remain as intended in the procedure. When the ash is cooled down to its temperature of normal cold it is

Ash colletion

collected in the densely interwoven medium size handy basket by interning the ash with a pressure of compact compress so as to form a pad-sieve of ash inside the basket.

Forming ash-sieve

The ash containing basket is kept in an empty tub (metal, wooden or earthen receptacle kind) or in a vessel of wide open mouth with bridge of its own foot/stand or by ready arrangement.

Forming ash funnel

Then, the ash filter/sieve will be made a concave hollow receptive central space without touching the bottom level of the ash basing on the inside bottom of the basket so as it will served as a funnel when pouring down water over the ash. The formation of the funnel will be better to have its bottom-end at about the half-depth of the whole depth of the ash containing in the basket.

LA-GI-ESING TAPHAM Leave sheet for water-falling when pour down in the Ash.

The water is to be poured is such a capacity of holding by the ash that it fills the funnel shaped concave portion of the ash so as the water have not any touch or contact with the inner surface of the basket. A piece of plantain-leave or any big leave of elsewhat plant is to be kept stretching over the curved centre of the ash as the water-falling sheet/point so as not to disturb/shatter/ruin the ash-shifter when the water is poured for fittration. Pouring of the water is to be started by keeping the view of falling the water-torrent/flow on the leave sheet kept for the purpose. The pouring water is to be made in slow and steady manner and it will continue until it finds its surface level at about the rim-level of the ash-funnel. The pouring is to be stopped and rested as the level does not decrease with slow-filtering/sieving through the ash.

Pouring of water

Reaction and dissolution of the alkaloid substances in the water to solvation for the vegetable-ash solution.

After sometime when the pouring-water stands over the ash, it will saturate/drench/wet some portion of the ash which is laying in contact with the water The wet ash as it were soaked in the water for a period so as to hold a reaction with the water it has to open its contains to the water is and it is decomposd into its components and constituents. The constituents of the ash are reduced to the molencular state and maintaining its own level/state. The organic alkaloid molecules then take the positions in the inter-molecular spaces lying between every two water molecules. Thus the alkoloid molecules mixed up with the water molecules. Such state of mixing or suspension of molecules in between the molecules more specially solid and liquid molecules is called dissolution or said as "dissoved", the solid in the liquid (John Dainlith, 1983, 196-97). Thus ths alkaloid substances in ash is dissolved in the water and the alkaloid solution is formed. The ash-water or vegetable ash fluid or solution passes through the ash-filter, and fall down drop by drop or in slow and steady solution torrent /flow over the underlying vessel or container. The alkaloid solution containing vegetable organic substance in water or the akaline-water of alkaloid property is received on the under-kept vessel and collected the same on another suitable vessel for use in the intended purpose/purposes.

Collection of Utti or Alkaloid solution.

3) Protective materials

The protective materials used by the Meitei in their handmade paper-making tradition are as the word protective directs, the auxilary materials for defence,and protection aginst the organic materials, harmful insects and organisms.

Typology of the Protective materials

These materials are in the typology of the Pesticides and Insectifcige substances. These materials shall have the properties of killing harming irritating etc. to insects and organisms. They are in the inclusion of pesticides and insecticides.

Pesticide : Chemical that can kill pests such as insecticide, fungicide, herbicide, etc. (P. K. Garg & K. P. Srivastave. 1994, 306)

Pest : Organism that damages and reduces yield of crop or irriates or injures livestock. (Ibid, 305)

Insecticide : Chemical preparations capable of destroying insect pest. Older method of burning was inadequate and furthermore, opened the soil in erosion ... ... D.D.T. Calcium and lead arsenates, nicotine sulphate and dicloro phenoxy acetic acid (2, 4 - D) . (G. E. Speck, 1960, 138)

The Meitei earns their protective materials for paper-making from the floral organic products more than procuring them from the founal or mineral resources. These organic maserials used by the Meitei as the protective materials have the properties of more or less unharmfulness to human health. The plants from which the protective materials collected are KEKRU (Sapindus mukorossii or S. laurifolius, fem. Sapindaceae), 2) TOMAL (A tropical evergreen shrub : a species of sapindaceae family), 3) LAMHEIBI (Gardenia campanulata, fem. Rubiaceae) etc. Among these plants the most wanted was the Kekru (Sapindus mukorossii). The protective materials collection is made from these plants in the form of their dried or fresh fruits.

Floral plants from which Organic protective materials are extracted -

Mode of collection of protective materials.

The collection of materials from Kekru plant is effected from the dried pulp of the fruit while for Tomal and lamheibi are excuted from the fresh pulp of the fruits.

Chemical contains of Plant fruit-pulps.

The fruit pulps contains organic form/state-substances of Washing soda or Sodium carbonate ($Na_2CO_3\ 10H_2O$), Baking soda or sodium hydrogen carbonate ($NaHCo_3$) and Caustic soda or Sodium hydroxide ($NaOH$). The insects and organisms avoid pesting on the materials/paper and gave up cutting/biting them due to the unhabituation and irritations effected /affected to the insects and organisms by these chemical substances,

Washing Soda or Sodium Carbonate (Soda ash Na_2CO_3) :

A white amorphous powder, which aggregates on exposure to air owing to the formation of hydrates. Industrially it is prepared by the ammonia soda (Solvay) process. On crystalling from aqueous solution large translucent crystals of the decahydrate ($Na_2CO_3 1OH_3O$) are formed (Washing soda). The effoesce forming the monohydrate ($Na_2CO_3H_2O$) … … … … The salt produces an alkaline solution in water by hydrolysis : $Na_2 CO_3 + 2HO \rightarrow 2NaOH + H_2CO_3$. (John Dainlith, 1994, 192)

Baking soda or sodium hydrogen carbonate ($NaHCO_3$) : (sodium bicarbonate) -A white solid formed either by passing an exess of carbon dioxide through sodium carbonate or hydroxide solution or by precipitation when cold concentrated solutions of sodium chloride and ammonium hydrogencarbonate are mixed. Sodium hydrogencarbonate decomposed on heating to give sodium carbonate, carbon dioxide and water. With dilute acids, it yields carbon dioxide. It is used as a constituent of baking powder in effervescent beverages and in fire extinguishers. Its aqueous solution are alkaline due to salt hydrolysis, sodium hydrogencarbonate forms mono clinic crystals. (Ibid, 194).

Sodium hydroxide (Caustic Soda : NaOH) :

A white deliquescent slighty translucent solid with a fiberous fixture. In solution it is a strong alkali and electrolyte ... ... sodium hydroxide dissolves readily in water with the evolution of heat. Its solution have a soapy feel and are very corrosive. It is used to absorb acidic gases such as carbondioxide and sulphur dioxide. Industrially it is used in soap and paper manufacture and in the purification of bauxite. (Ibid, 194).

Preparation ef Protective Materials from dry fruit :

This preparation is mostly utilized in the case of the Kekru (Sapindus mukorossii) because it is preserved in dry candition. The dry fruit has a covering of dry pulp about 0.1 cm. to 301 cm. thick. The cover is peeled off and collected the dry pulp by throwing away the hard seed. Then the pulp is soaked in water at least an hour so that it may be soften enough for hand-squeezing to take of the absorbing water by it. The water

Peeling of the pulp

soaked pulp is imbued and increased its volume of mass. It is squeezed to extract the volume of water it has absorbed in course of the soaking/saturating/steeping. The process of squeezing is done well and the solution/fluid extracted is colled in a receptacle. The extracted solution is poured in the processing basic base materials of handmade paper-making so as to have the protective property against the insects.

Property of the solution

The extracted fluid/solution of the dry pulp of Kekru soaked in water contains organic substances. The organic substances contain as it is stated above. The solution is to keet for some time after good stirrings with a piece of wooden or bamboo laddle so as to dissolved the contains of the organic substances in the water. As stated above the organic substances dissolved solution contains a thick sodium compounds which have the properties stated above. This substances will ward off the insects from doing/effecting harms/spoils on the paper.

4) Adhesive Materials

The adhesive materials applied in the making of Meitei Che or Manipuri handmade paper are directed by the meaning of the nomenclature of the utilizing material as the word, adhesive and its root verb "adhere" are carrying the senses in their mottos and motives. The word "adhere" expresses and indicates as —"stick fast, give support or allegiance." Therefore, the word "adhesive" is bearing the sense and meaning of attaching and binding properties. In short, the adhesive materials used by the Meiteis in paper-making are the attaching/sticking substances/agents to fasten/bind together the separated/dispersed organic substances/elements containing in the decomposed or broken up plant bodies into its components/constituents. These materials fasten or bind tightly together the parted/divided portions/constituents as the original elements by decomposition to form a dense compacted mass so as to find a piled body of organic substance in making the hand-made paper. The heap, accumulated in flat accretion by the external or extraneous addition of the organic elements will be defined as the paper which comes and bring to the position by the auxiliary work of the adhesive materials.

Definition

Typology of adhesive materials.

The adhesive materials so far used by the Meiteis in their indigenous handmade paper-making tradition are all vegetable/plant glues. Even though the land of the Meiteis is in the inclusion

Floral and founal gums and adhesions

of the plant and insect or floral and founal secreted gum resource area and the Meiteis have in abundant availability and available of the plant and insect-gums and adhesions in the forms of resins, lacs and lacquers in their father habitat country or mother homeland Manipur. They did/do not use gums or viscid secretion of plants (some trees and shrubs, specially of Rhus femily) and insects (specially lac insects: Coccid insects, fem. Coccidae). They employ only the vegetable glues prepared by themselves as their home products.

Employing floral species and substances

CHUJAK-CHANANG (Maize-glue)

The most important, familiar and populur plant in among the glue-production floral species and the most common and frequently used is the CHUJAK-CHANANG or glue of the fruit/corn/crop of the maize plant (Zea, mays, fem. Poaceae). This crop is reffered to the Meitei Royal Chronicle as to have been an enjoying item of recreational hours (Ibungohal & Khelchandra, 1989 51) because the rice is the staple and principal food of the Meiteis. Even though the rice was/is the most abundant and Common cereal and glue-production crop in Manipur and its glue was/is used in many purposes, the glue of the maize is using in the case of hasdmade paper-making because the corn/crop contains greater percentage of protein than the rice. The protein as provided is —

Protein : A class of complex nitrogenous organic compounds of high molecular weight (18000 -10,00,00, 000), which are of great importance to all living matter. Protein molecule consists of hundreds or thousands of amino acids joined together by the peptide linkage into one or more inter-linked polypeptide chains, which may be folded in a variety of different ways. Some twenty different aminc-acids occur in proteins and each protein molecule is likely to contain all of them arranged in a variety of sequences. It is the sequence of the different amino-acids that give individual proteins their specific properties ....(Alan Isaac & E. B. Urarov, 1979, 339-4o).

Protein : Group of highly complex nitrogenous compound comprising some of the most important constituents of plant and animal cells. They are collodial substances of highly molecular weight. Protein variably contain carbon, hydrogen, oxygen and nitrogen and sometimes sulphur or phosphorus... (G. E. Speck, 1960.196).

This protein makes the paper stiff and rigid inspite of bending/drooping away. The Meitei, whether knowingly or unknowingly the chemical contains and properties selected this item of adhesive material which has the additional power of stiffening the product more than its sticking property.

The other plants, the fruit/crop of which are worth for obtaining adhesive glues are — PHOU (Paddy or rice plant : Oryza sativa, fem. Poaceae), CHANAN (Indian millet : Ponicum miliaceum or P. miliare, fem, Poaceae), GEHU (Wheat : Triticum aestivum, fem. Poaceae), Alu (Potato : Solanum tuberosum, fem. Solanaceae), PAN ; (Arum : Arum maculatum, fem. Araceae) MANGGRA (Sweet Potato : Ipomea san bae, fem. Convolvulaeae) etc.

Other plants for adhesive materials

Process and procedures for preparation of Glue

The process and procedures for preparation the glue are the simple process and procedures of powdering in the cases of the corns and boiling and squeezing tubers in the cases of the underground tubers (the last three items). The powdered pieces of the Corns or the floured pieces of the tubers are/is added to the basic base floral materials containg in a jar/pot in mixed up state with the catalytic and protective materials.

Mode or typology of preparation.

Primitive method of powdering corns by Handpounding.

For the preparation of adhesive materials from the corns, the primitive method of hand pounding was employed. For this purpose a SUK/SHUK (Wooden rod with metal tipped end for pounding), a SUMBTL/SHUMBAL/SUPHAL (pestle ; a preferably wooden big one) and a winnow are essential. The corn taken is winnowed and removed/weeded/cleared off the unwanted filths and dirts. Then take off the unwanted floral membranous covering of the corns if necessary. Some of the corns is kept in the curvature/hole of the pestle. Then pounding begins and proceeded until the flour/powder gets its finery. For the cases of tubers/the simple method as it were mention above.

Implimental Equipments

The implimental equipments required as a whole for moulding/making the Meitei Handmade paper are not different or varied from those of their daily using domestic equiptments and instruments. The Meiteis are proud of their daily used tool/weapon/instrument/impliment or multi-purposed equipment THANGJOU (Chinese linguistic style) or THANGCHAO (Tai linguistic fashion) which can use in all the matters of human work such as cutting, peeling, chopping, digging, clearing, scratching, carving, etc. The virtues of this equipment is modified by the winning of prize/award given by Meitei-lord to a house builder who built a Meitei house with this equipment only from foundation to finishing touch. This Meitei familiar and favourite THANGJOU will serve all the matters needed for a blade or sharp edged and tipped weapon/tool.

THANGJOU, the Meitei Multi purpose weapon or equipment /instrument

Other essential equipments.

The other essential equipments are i) a big basket (Sangbai) for putting in the basic base raw materials, ii) a big CHENGCHAMLUK (this basket is meant for washing raw rice) or a densely interwoven Likhai (Half of a Lee/Sangbai) or Laitang (one fourth of Sangbai) or an other big basket containing ash, iii) Vessel/tub for receiving alkaloid solution, iv) A big earthenware jar/pitcher (Kharung or Ngangkha or

Tongloi) for soaking and boiling the paper-making materials, v) big tongs, Chegap, vi) a plank or board for speading the cooked and ripe materials so as to serve as a base-board of paper-making, vii) smoothed roller rod made of wood/bamboo, viii) a scissors for peeling the edges and others, ix) a paper-surface smoothing or rubbing KANGKHIL (Seed of the fruit of Castus speciosus, sub-fem. Zingiberaceae, fem. Scitamineae) and x) big bamboo/wooden Paddle or Khabei and xi) some 3/4 baskets pots are to be readied.

Technical and Technological Procedure of paper-moulding.

The Meitei technical and technological procedure of handmade paper-making is so called previously instead of telling paper-making because the technical method and technology taken up in this process is entirely of mould and founder. The word, mould means, in English as Mould (US, mold) , n, a templet : matrix in which a cast is made :a formed surface from which an impression is taken : the foundation upon which certain manufactured articles are built up : a thing formed in a mould, esp, a jelly or blancmange ... ... a wire tray used to make paper by hand ... ...

Typology of the technology of the Meitei handmade-paper-making.

ns. moulder, moulding; the process of shaping esp. any soft substance : anything formed by or in a mould : ... ... (Catherine Schwarz & others, 1990, 936).

Differences between the Meitei and the Burmese tradition of paper-making.

So the Meitei traditional model and the other traditional models are all in the technology of moulding The Burmese traditional technology has differences in the procedures of— a) forming pulp and b) the Burmese procedures of coating the paper and which are not taken up by the Meiteis. Even though the Nature's gift, the most wanted raw materials Ma-hlaing (for Burmese language) and Su/Shu (for Meitei language) are commonly stand for the species of Broussoetia papyrifera in the local and native variation even when some procedures are concided, are ruling the two traditions.

The procedures of Meitei handmade paper moulding/making go as under :-

Procedure I : Preparation of raw materials.

The plant taken, is washed and trimmed off its leaves and twigs. The parts of the plant is cut at about the length of 15 cm. per piece and deposited in the big Sangbai/basket. The leaves can also be included in the deposit.

Procedure II : Preparation of auxilary raw materials.

If fibrous materials such as rugs, cloths clothes, braids of threads or yarn, ete. are to be added they are also to be made into pieces,

Procedure III : Treatment of catalytic materials and soaking in it.

All the prepared floral materials of both the raw vegetables and died/dry materials of cloths etc. are mixed up together throughly and then the all materials is interned in the soaking jar/pitcher. The catalytic materials which is in form/state of alkaloid solution is added in the quantity so as not to be overflooded with the liquid when the raw plant materials are decayed and rotten. The alkaloid solution made from the vegetable-ash of Khutchum-pere or Laphu, etc. when treating for soaking it must not be more than the half level of the jar. A lid which fits to the mouth of jar is to cover over the opening. Then the whole is taken to some corner where it will not interfere/interrupt other work and it will not be disturbed and kept there for soaking the material to rot and decompose for sometime.

In this procedure, the Meitei soaked the materials in alkaloid solution while the Burmese pounds the materials with water to form a pulp and then treats lime solution/powder/paste. In this regard of treatment of lime, the quantity is half of the whole weight of the vegetable pulp.

Procedure IV : Closing the Soaking & Treatment of Adhesive materials.

After soaking the materials in such manner for two days or so, bad smell of rotten materials will spreaded in the air. When such smell is sensed by the sensitive organ it is to know that the time for closing the soaking period is in near future. After 3/4 days soaking in summer and 5/6 days in winter is the high-time for opening the lid of the jar and closing the soaking period and next procedure is to be taken up without delay. After opening the lid the adhesive materials prepared as glue from the powder of the corns or from the tubers is to be added. The quantity of glue will be just the same quantity of the rotten vegetable materials. All the mixed up materials ef the rotten vegetable and the glue is stirred and agitated with a long handled ladle throughly again and again so that the containing different substances/elements in the different/unlike materials may dispurse and distribute completely and entirely in the themselves so as to form a uniform mixture.

Procedure V : Setting up fire and Boiling.

Fire is set up and is looked after for having regular flames to give obtainable heat so as to get enough temparature. Then the tripod iron is kept for having stand for the thing to be kept over the fire. The jar containing the vegetable material-mixture is put on the tripod-stand and boiled its contents over the fire.

Procedure VI : Treatment of Protective Materials.

When boiled enough about 15 to 20 minutes and precipitations or bubbles of boiling are blown up the protective materials prepared from Kekru or elsewhat pestilence/insectifuge is treated in the boiling materials as salt is treated in curries.

Procedure VII : Attaining the Ripe-stage.

After the treatment of the protective material the whole is boiled as it were before. It will keep under good heat/temperature of the fire so as to dry up the liquid/fluid portion is attained the decrease of its volume. If the liquid is dried up in quick when the ripe-stage or wanted state of the material is not yet attained, water will be added/treated newly. Then the boiling is to be continued and proceeded.

Procedure VIII : Testing of Ripe-stage

When the ripe-stage of the material from the boiling comes it will be tested. The test of ripe-stage is similar to that of the Burmese test. When almost all the liquid is appeared to dry up due to the continual evaporation of the water a paste state is appeared on the material just as the kneading flour does or dough or mud gets its state. A little quantity of the paste is taken out and kept in between the forefinger and thumb. The two fingers will press in softly to the paste. By that action if the piece of the paste has been crumbled to crumbs it is confirmed that the ripe-stage is attained and the jar may be taken out from the fire. The hot jar is kept somewhere to cool down its contains.

Procedure IX : Clearing and Retrieved of the paste

When the paste material is cooled upto the state of not so hot it will be looked after not to contain unwanted filths like long fibres, hairs etc. so as to disturb the uniformity of the product and it will be cleared of all these matters. It will be retrieved of all the unwanted things.

Procedure X : Setting Paper-making Board template.

After completion of all these arrangements the paper base/mould - plank or wooden template of paper is carried in and set it in position. Then the paste-material is poured out on the board template from the jar. It will be treated as it were done in bread making.

Procedure XI : Making Paste-balls and then Sheets

The paste is kneaded and then separated in quantities so as to make balls as many as number of paper-sheets in the expected need. Then the rounded balls are broaden one by one by squeezing, pressing and beating with palms. The some what flatten paste balls are then kept over the plant mould and they are to be rolled over again and again with solid cylindrical wooden rod so as to form thin sheets. It is to be careful in rolling for the uniformity of thickness of the paste -material to produce uniform sheets of paper.

Procedure XII : Brown Sheet, the Handmade paper;

After completion of rolling procedure all the wet sheets are found spreading over the wooden base-plank. The base-plank along with the wet-sheets are brought out in the sun so as to bake the sheets in the sun. When the wet sheets are dried up each of them becomes a brown sheet which is nothing other than a sheet of the Meitei handmade paper just to be touched with the finishing touch of the paper-making.

Procedure XIII : The Finishing Touch.

The brown Meitei handmade paper sheets are to be trimmed its ends. Scissors is to cut off the extended/projected edges around each sheet.

Then the paper sheet is put over a smooth surface of plank, and the irregular surfaces of the paper is flattened, smoothened and regularized by rubbing the surfaces with Kangkhil (seed of the fruit of Costus speciosus). This arrangement is to be done all over the surfaces of the sheets and the sheets thus become sheets of writing paper.

"Meitei che" produced by the Meitei handmade paper-making tradition takes much time in its preparation and production. Even though it is more durable then the modern machine-making paper in writing it cannot compete with the latter paper because of better economy of the money and time. But in olden days when the Meiteis were not in close relationship with the British-merchants, "the Meitei Che" was swaying all over the dominion of Manipur.

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THE TYPOLOGY AND TECHNOLOGY OF MEITEI HANDMADE INK-TRADITION

Ink, the colouring material is being necessitated for visual focusing of the scripts and figures on surface-writing, painting, drawing, etc Its relation and collaboration with writing cannot be separated and parted from it. The origin of ink as colouring materials has already been traced in history of writing in the Universal context and as cited above. It was invented during the period of papyrus writing dated within C. 5000 B. P. to 2000 B. P. But the actuality as provided, is likely to be at c. 4500 B P. and the place of the first utility of ink was probably in the Egypt. From this place the knowledge is assumed to spread all over the world. But as Chinese invented the paper, the knowledge of using ink was probable to develop due to the fact that writing on paper is highly essential for ink, Colour for colour-use is not a matter here in the referring sense of the ink.

Origin of ink in Universal context.

The ink is meant as —

Ink : a black or coloured liquid used in writing, printing, etc; a dark liquid ejected by cuttle fishes.

Introduction of ink in Manipur.

As the history of writing in the context of Manipur refferrs as it entered in Manipur in the fifteenth century of our Era. In this case it is observed that if there was writing in the latter period of ancient history, there was ink because after the invention of paper by Chinese people in 1st/7th century, A. D. the writing on paper was always associated with ink. Therefore, the introduction of ink in Manipur was probably in the same century, the 15th century A. D.

But the introduction of the art of hand-made ink-preparation was also in collaboration with the introduction of the art of paper-making even some private inks were prepared by someones. It is assumed that these are the nominal introduction of the writing materials. So the art of ink-making was started and run side by side with the art of paper-making formally in Manipur.

Typology of Meitei handmade ink

Nomenclature of ink in local dialect.

The indigenous Meitei handmade ink is known as "Muk" in olden days and sometimes it was called "Kali" also by some one because it is black/dark in colour and the blackness and darkness is said as "Kali" in ancient Indian dialects. But now-a-day this indigenous ink is known to its people with a qualifying preposition of racial/ethnic name as "MEITEI MUK" to mark a proper entity and identity of it from the modern imported inks.

Typology

The typology of the "Meitei Muk" or Manipuri indigenous local ink is as it were done in the case of Meitei handmade paper-making tradition because the land of Manipur was the trading and commercial harbouring-pad and meeting paddock of the vice versa purchasers and sellers of the east and the west. Therefore, the two facts of the typology of Meitei handmade ink-making traditional craft are of the traditions of the east and the west. Both the traditions were of the eastern one more specifically the oriental style of Tai-Burmese ink-making tradition and the western one more particularly the western fashion of Bengal ink-solving tradition.

Oriental style of ink-making craft.

The oriental style of ink-making craft stood on its own legs by depending upon the floral, founal and mineral resources for its textural fabric materials. The western fashion of ink-solving tradition was habituating on its own customary habitual fact of solving the products by Chemical experiments on imitation and laboratory analysis of the oriental or eastern productions (say, gun-powder, silk, etc.) of scientific materials. Theirfore, the basic base materials of western tradition are differed from those of these of the oriental tradition even when there are some similarities with regards to the auxilary materials.

Western fashion of ink-solving craft and its difference with the Oriental tradition.

The Technology of Meitei Handmade Ink-making

The Meitei being a big ethnic group made up of mixing and fusion of various different ethnic groups of Mongoloid and Australoid stocks on its soil of laboratory-products of making new things different from any of the products of discoveries and inventions of the worlds has using the technology of the both traditions of the east and west by its different ethnic groups migrated from different directions of the ancient and medieval territorial jurisdictions of Manipur. The Shan ethnic groups (Say, Khunpongmayum, Chingsubam, etc. — Nongpok haramlon script, M. S.) are operating the oriental

The laboratory-soil of Meitei-production,

style evoluted from China while Bengali ethnic groups (says, Lairikyengbam, Ayekpam, etc. Nongchup haramlon, script. M. S.) are habituating in western fashion probably originated from Arab. The techniques and technologyies of both the traditions are describing in their own fashions at under :

(A) The Oriental Style of Ink-making.

Origin of Oriental Style of Ink-making

The oriental style of traditional ink-making adopted by the Meitei, the man of the Tai is appeared to have been originated from the traditions and customs of the processes and procedures of the tecenology of dyeing, painting, and colouring. Its originating complex was probably China as the question of possibilities are raised by — i) the invention of the paper in the first place or position of the world, ii) her laborious art of colouring and dyeing on seres threads, yarns and cloths (Peoples Republic of China, 1974, 57) and iii) artful and colourful production-works of pottering, lecquering and painting on various textures (Ibid, 47-48, 42-43). It is appeared that the less utilized colours and colouring materials in dyeing were transfered to the painting and writing arts. The art of making the writing ink in Manipur was probable to encroach in the boundary of Manipur by bringing in this land with the cultural and ethnological materials and artistes exchanges undertaken during the regime of Meitei-lord Kiyanba in 1470 A. D. (Ibungohal & Khelchandra 1989, 19-20 : Nongpok Haramlon script, and Sorarel Macha Khunkumba script. M.S.) as the first event of Manipur and was probable to start some 2/3 years later from the date so as to respond the call of the necessity.

Encroachment of the Art in Manipur.

Resource of Essential Textural Materials

Resource of Meitei Indigenous writing ink

The essential textural material for making the Meitei indigenous, traditional writing ink are the handmade products in the kind of working-products on the natural resources. As it were already cited above the resources of the floral, founal, mineral and soil produced materials are in uses. They are collected and gathered as both in organic and inorganic substances from the natural resource of Manipur as plant, animal mineral and soil remains, products remnants, etc. These essentially textural materials can be catagoried as — i) Basic base/foundation-materials and ii) Auxilary materials as it were divided

Divisions and sub-divisions of the Textures of the Meitei Handmade writing materials,

in the case of the Meitei Handmade paper-making tradition. The auxilary materials can again be sub-divided into four groups such as— i) catalytic, ii) Adhesive, iii) Protective and iv) Preservative materials as it were done in the case of Meitei handmade paper-making textural materials with an additional item of preservatives. The particulars of them are´described as belows ;

i) Basic Base/Foundation-Materials.

Plant for extraction of basic base textural fabrics of Meitei writing ink.

The Meitei depended mostly on the floral vegetation for collecting the texural fabrics of making their traditional indegenous writing ink. For this matter some trees and shurbs are remarkable. Some of them are— i) KAPHOI (Pomegranate : Punica granatum, fem. Ponicaceae) ii) HEIKRU/HEIGRU (Emblica myrobalam or E. officinalis, fem. Euphorbiaceae), iii) YONGCHAK (Parkia javanica, sub-fem. Coesalpinieae, fem. Leguminosae), iv) SHAYI (Brindela retusa, fem, Aporynaceae, v) KUHI (Holarrhena antidysentrica, fem. Aporynaceae) etc.

MELANIN

There are organic substances in the barks and fruit - peels (in case of the pomegranate and Parkia fruits) of these trees and shrubs. This substance causes blackness or darkness when the barks or the fruit -peels are soaked in water. It is the substance/pigment called "Melanin" which causes the blackness /darkness in the living organic materials/substances of the skins of the Mammals.

The substance melanin is described as —

a) Melanin — Group of brown or black pigments in plants and animals, (P. K. Garg & K. P. Srivastava, 1994, 248).

b) Melanin — noun, dark pigment which gives colour to skin and hair, also found in the Chorcoid of the eye and in certain tumours.
(P. H. Collin, 1990, 210)

c). Melanism — more than abnormal development of dark colouring matters. (Catherine schwarz, George Davision & Others, 1990. 888).

The dark or black pigment of the ink.

From this organic melanic pigmentation found in the organic substance of floral plants, the dark or black pigment is extracted. So one of the plants may be used but the most choiced two plants are Shayi and Kuhi.

ii) Auxilary Materiels

The above stated basic base/foundation material to be flavoured by treating with the auxilary materials. The auxilary materials have their own functions in helping the ink for its utility, quality and property as it were interpreted by the nomenclatures of the materials. The auxilary materials, under their respective heads are accounting hereunder :

1) Catalytic materials or Mordant

The catalytic materials as described above in the case of the Meitei handmade paper-making tradition are the catalysts which acted/reacted upon the basic base materials to speed-up/accelerate the rate of change of undergoing reaction for decomposition of the organic substance into its molecular level/ state. They also acted as mordants. The mordants as provided :— Mardants : Substances used in dyeing, espicially fabrics of plant origin. The fabric is first impregnated with the mordant, which is generally a basic metal hydroxide for acidic dyes, or an acidic substance for basic dyes.

Mordant for sticking the ink pigments.

The dye then reacts chemically with the mordant forming an insoluble lake, which is firmly attached to the fabric.
(Alan Isaac & E. B. Uvarob, 1980, 275)

Lake — In dyeing, a coloured insoluble substance formed by the Chemical combination of a soluble dye with a mordant. (**Ibid**, 235)

Lake 2 — **n.** Reddish pigment, originally made from lac : Pigment made from animal, vegetable or coal-tar colouring matter combined with matallic oxide or earth…… …
(J. Coulson, C. T. Carr, & Others 1960, 456)

So the catalytic materials for the Meitei indigenous traditional writing ink-making have the properties to stick the black pigments to some extent to help the adhesive materials.

Typology of the Catalytic materials.

The Meitei use to be habituated in employing the catalytic/mordant materials as the alkaloid solution or the UTTI as it were done in the case of their paper-making. It can be employed the Khari (Alkali) or Khari Machang (Redical alkali) instead of the alkaloid solution or vegetable ash-solution

Plants for collection of ash in repeatation to those of paper-making

as in the case of paper-making. But the Meitei as accustomed to the vegetable-ash solution or plant-alkaloid, The alkaloid solution is taken or obtained by the process described above in the case of paper-making and the plants for collection of or reduction to ash are also the same. But the names are repeating for reference of reminiscence — i) Khutchum/Khujum pere (Achyranthus aspera, fem. Amaranthaceae) ii) Changbi Laphu (Musa paradisiaca, sub-fem. Musaceae, fem. Scitamenaceae), iii) Hei Laphu (Musa Sapientum, sub-fem. Musaceae, fem. Scitaminaceae), iv) Garden and Field peas, beans, grams, specially, soyabean (Glycine max/soya/soja, sub-fem. Papilionaceae, fem. Leguminosae), common garden pea, v) Arum species, vi) Thetch plants (Specially Saccharum spantaneum, fem. Gramineae), vii) Straw plants — Specially the stem of paddy/rice plant (Oryza sativa, fem. Gramineae/Poaceae), viii) Alocasia species, fem, (Araceae) etc. and a more specialised plant called by the Meitei dialectical name **PULEI** and the English dialectical name "Cardamon (Alpinia allhughas, sub-fem. Zinziberaceae, fem. Scitaminaceae). The most wanted two among these plants are Khutchum pere and Pulei.

Extraction of Alkaloid and Alkaloid-solution solvation

Reaction of the alkaloid catalyst with the basic base-materials to gear up the rotting.

The process and procedures for extraction of alkaloid and solvation of alkaloid solution in water with the ash of the plant are already described above in the Meitei Handmade paper-making. Please see over there in the above. The molecules of the alkaloid will react with the molecules of the organic substances in the plant body of the basic base-material molecules in such a way that they will not suffer any chemical change within itself but to gear up the rotting and decomposing the organic substances of the plant-body to find its molecular state with giving a little power of corrosive and erosive strength for attachment of pigment molecules suspended in the solution state.

II) Adhesive materials

The adhesive materials employed by the Meitei in making their indigenous traditional writing ink are the materials as defined by the word "adhesive " for sticking and attaching, But as to indicate the operation of sticking/attaching the materials have two functions. One is to stick themselves together so that there will not be irregularities on the surface of the pigment so as to reflect or refract light/ray in uniformity for visual vision. The other is to stick to the surface on which the pigment is to be fixed in uniformity so as not to spread or disperse the pigment any molecules so that the pigment will reflect/refract good colour vision rrys. So for these two functions/purposes the Meitei treated the basic base-material which will given out the colour-pigments with two different substances which are obtained from two different materials. The two materials and their substances with the functions are describing as belows .

Definition in two aspects of functions

a) Floral material — This material is for obtaining substances to stick the particles/molecules to attach/fasten each other. They are mainly of carbohydrates for forming glues. Carbohydrates are the albuminous silts of vegetable or animal organic substances and it is defined as — Carbohydrates : A large group of organic compounds composed of carbon (C), hydrogen (H) and oxygen (O) only with a general formula $Cx\ (H_2 O)\ y$ .... Carbohydrates play an essential part in the metabolism of living organisms, starch being the principle form in which energy is stored and cellulose being the principal structural material of plant .... (Ibid, 63)

Floral organic glue materials

The substance will fixed the stained pigments of the ink. Such substance say, carbohydrates, these are obtained by employing floral materials. So any of the glue obtaining plant products or produces stated above in the case of the adhesive materials of Meitei paper-making tradition can be used in the manner received after the preparation as described above. But the Meitei prefers to employ the rice-flour in this case as specialised material of adhesion. The rice is to be pounded on a pestle with pounding rod so as to get in fine dusty particles/powder. It is to be sieved through a medium course-piece of cloth. Only those powder-particles which pass through the cloth-sift are treated. If the rice flour which are sieved do not attain enough quality the broken rice particles are to be pounded again and repeated

Pounding the rice-flour

the sieving process. It is to be treated in enough quantity. This is the same and similar mode and models of the treatment of glue in the case of Meitei writing paper-making tradition.

b) Founal & Floral materials :

Founal sticking gum lac & Floral sticking gum/lacquer.

This founal floral material is treated to the basic base-material for attaching/fixing the colour pigments on the surface of the writing sheet and will fasten and stick the pigments which the liquid portion of the ink is evaporated when the ink is dried as a smooth surface of Lake with glazing/lacquring state is formed so as to reflect/refract a pleasing light/rays. The material of founal-floral product is termed by the Meitei as CHA (lac). This term " CHA " known to the Meitei is of two kinds even though both of them are generally known as "Lac" in English But in strick sense, one is lac and the other is lacquer, the insect secreted resins on the twigs and the other is "lacquer, the plant secreated resinous fluid They go as—

CHA : Lac 1) Resinous incrustation produced on certain trees in E. Indies by the insect Tachardia lacca and used as varnish or as a substitute for true lacquer : known when melted and formed into thin plates, as shellac. Scarlet dye obtained from females of same insect, (loosely) lacquer, lacquerware (J. Coulson, C T Carr & others, 1960 454).

ii) n. a dark-red transparent resin produced on the twigs of trees in the East by coccid insects (lac insects) (Catherine Schwarz, George Davision & Others, 797)

Resins — Natural resins, amorphous organic compounds secreted by certain plants and insects, they are usually insoluble in water but soluble in various organic solvents. Typical natural resins are rosin and shallac. Synthetic resins were originally described as a group of synthetic substances whose properties are resembled natural resins .... (Alan Isaac & E. B. Uvarov, 1980, 313) .

Coccid/coccus, n. a one-seeded portion of a dry fruit .... a spherical bacterium, a genus of insect in the Hemiptera, type of a family Coccidae .... Coccid, any of the Coccidae............ (Catherine Schwarz, George Davision & Others, 274)

CHA : Lacquer - **n.** a solution of film-forming substances in a volatile solvent esp. a varnish of lac and alcohol : a similar substa-

nce sprayed on have to hold it in place : the juice of the lacquer tree (Japan lacquer)…….
…………… Lacquer tree — a tree of the genus Rhus — (Ibid, 797) . Rhus — the sumach genus of the Cashew nut-family : (without cap), a plant of this genus, (Ibip 1261) .
Cashew tree — n a spreading tropical Amrican tree (Anacardium occidentale) with kidney-shaped nut (Ibid, 221) .
Lacquer — n. 1. (true or far eastern—) Natural sap of — tree (Rhus vernicifera) used since ancient times in China and Japan as protective and decorative varnish (usu, applied in thin layer to wooden objects or inlaid on metal wares). (J. Çoulson, C. T. Carr & Others, 1960, 454)

The first Cha, the insect secreted lac are collected by the Meiteis from the plants and they think that it is the plant secreted substance or gum.

Some plants from whose twigs the lac are collected

Some examples of plant which are frequented by the Meiteis for collection of lac are — i) MAIRONGBI (Cajanus indicus, fem, Leguminosae),
ii) CHIGONGLEI (Accacia : Bot., Accacia farnesiana , sub-fem. Mimosae, fem. Leguminosae) etc.

The second Cha, the plant secreted lacquer are collected by the Meitei as the lacyeous/milky fluids, jellied juice, gelatinous liquids, etc. from the resin duct/canal of plants. The resin and resin duct/canal is described as :—

Resin — Mixture of high-molecular weight compounds, mainly polymerized acids, esters and terpenoids, exuded by certain plants, particularly when wounded. These are water, insoluble and ethanol soluble on exposure to air, volatile components evaporate and solid or semisolid residue left that protects damaged area. These are common in conifers, found in specialized resin canals.

Resin canal (resin duct): longitudinnally running resin containing channel in secondary xylem and leaves of many gymnosperms, Usually formed by separation of parenchyma cells that later form inner lining of canal termed epithelium. (P. K. Garg & K. P. Srivastava, 194, 357)

There are some species of plants in Manipur which secrete the actual and inferior quality of lacquers. To produce examples are — i) KUHI, ii) YONGCHAK, iii) KHE or KHE-U (Melanorhoea/Melanorhca usitata, genus Rhus, fem. Anacardiaceae), iv) CHA PAMBI/PANBI (Lacquer-tree or Japanese lacquer tree : Rhus vernicifera, fem. Anarardiaceae and other species of genus, Rhus) etc. Among these the Meitei want and regard most is the last one but the plant found popularly is a species of the same family known as Rhus parviflora, fem. Anacardiaceae.

Collection lac and lacquer

The Meitei collects the lac from the twigs/branches of the shurbs and trees but they are habituated and favorite with the shurb/twig collection because they are not so tall. The actual Typology of collection or gathering the lac is mostly in the simple form/way of plucking the resin from the twigs and branches but sometimes they are using knives or pointed or edged instruments for the plucking of the lac.

Typology of collection of Lac from twigs.

The collection of lacquer from the Cha Panbi or lacquer tree (Rhus parviflora) in Manipur is in the typology which the Japanese has collected their lacquer from their lacquer tree (Rhus vernicifera). The procedures go as — The bark of the tree is scratched or cut a canal like a course all around the bark. A small pot

Typology and process of collection of lacquer or plant-fluid from the tree

is kept to receive the flowing down fluid which is secreted from the resin duct of the plant. The collection is done when it is dry or when it is in liquid state and it is treated when it is time to treat in course of the preparation of the ink.

Addition or treatment of Cha/lac/laccuer in making the Meitei indigenous traditional ink not only serves as an adhesive material but also do some protective, preservative and bright services on the written forms and figures with the ink so as to increase the durability of the ink.

The above additional services are due to the formation of gelalious transperent covering on the forms and figures of the writing. The film forming property produces a lake. This lake covering is not slightly soluble in water. The glazing covering reflects/refracts light/rays sufficiently to produce a good vision to the eye. In some case the inside-powder of bamboo is olso treated to increase the glazing/ brightness of the covering lake.

iii) Protective materials.

The protective material treated by the Meiteis in there indigenous writing ink-making are defined as the word protective means. This auxilary materials have some properties or more properties of pesticides and insecticides. Therefore, the typology of the protective materials are the Chemical pesticide or insecticide. The purpose of treating them in the ink-making has multi-objective type. As the adhesive materials serve multi-purpose functions these materials also serve the same upto the condition of preservation because protection goes hand in hand with the preservation in this motto.

Typology of the protective materials for ink-making.

The treatment of protective material to the basic base-material of Meitei traditional ink-making is started with treatment of adhesive material. This case of the service of adhesive material as the protective materials in the course of treatment of the second phase i. e. the treatment of "Cha" (Lac/Lacquer) as the gum is to be studies further in its Chemical property — that the Cha (lac or lacquer) are all resins. As the resin is defined on another way as —

Resin — An acidic substance, either a phenolic derivative or an oxidation product of terpenes. The resins are insoluble in water but soluble in alcohol, ether, and carbon disulphide, and burn with a sooty flame. They are products of secretion or disintegration which are usually found in special cavities or passages — (George Usher, 1983, 321)

Phenolic resin : Phenol formaldehyde resin — A very widely used type of synthetic resin produced by the condensation of phenols with formaldehyde : it forms the basic of thermosetting moulding materials and is also used in paints, varnishes and adhesives.
(Alan Isaac & E. B. Uvarov, 1980, 317).

Terpenes — A class of hydrocarbons occurring in many fragrant essential oils of plants. They are colourless liquids, generally with a plesant smell. Terpenes include pinene, $C_{10}H_{16}$ the chief ingredient of terpentine : and limonene $C_{10}H_{16}$ found in the essential oils of oranges and lemons (Ibid, 421)

The phenolic derivations and terpense are insoluble in water. Therefore, the lake-cover of the resin formed on the surface of the ink when it is dried can be harm or affected by water. As it contains phenolic derivations the insects are not habituated and are irrilable to insects. So they do not want to bite the ink stain-bodies/materials and it become an insecticidel substance. Thus it serves the protective function from the insects.

Other protective substances and other sources

Nacotine extraction from the tobacco-leave by soaking in water for about 2 hours.

The Meitei also applies other materials /substances for protection against the insects of every kind. Such other substances are Necotine and Alums. These substances are procured by them from floral and mineral sources. The Nicotine is available at the rate of 2·/. - 8·/. from the HIDAKMANA (Tobacco leave : leave of Nicotiana tabacum, fem. Solanaceae) . The tobacco leave is soaked in water for about two hours. When the water reacted on the soaking of the dry leave of the tobacco plant the leave -contained organic substances aborb the water and its volume increases as well as the dry leave moist/damp with water. Thus the nicotine contains in the organic substance of the leave floats out and enters in between the intermolecular space of the water.

Thus the nicotine forms its solution in water. The nicotine is described as —

Nicotine : $C_{10}H_{14}N_2$, A colourless, intensely poisonous oily liquid alkaloid 6 p. 247. 3° C that occurs in tobacco leaves — (Ibid, 285) .

Nicotine : An alkaloid 1-1 methyl - 2 (3-pyridyk) -pyrrolidine, derived from Tobacco (Nicotina tobacum) leaves. Use as an insecticide — (George Usher, 1983, 248).

Nicotine : Alkaloid produced by trichomes of tobacco plants, which has some insecticidal properties (P. K. Garg & K, P. Srivastaba, 1994, 271).

The Meitei calls the alum as FIJIGRI or NUNGSHIL. These alum is defined as —

Alum, **Potash** alum. $K_2SO_4Al_2(SO_4)_3 24H_2O$. Crystalline potassium aluminium Sulphate. The compound occurs naturally and is used as a mordant in dyeing, for fire-proofing and other technical purposes.

This alum is treated as a protective material in making the ink. By adding this the ink cannot be burnt at the very moment of setting fire on the dry ink as it were a fire-proofing substance. But the Meitei treated it in hope of insecticidal purpose.

iv) **Preservative material.**

The Meitei are careful enough in their making the indigenous native writing-ink. They treat auxilary materials to the basic base textural fabrics for helping to gear up or to quicken the act of decomposition of the original materials in the plant body, adhesive material for attaching the particles of the textural fabrics as well as to stick or fix the colour pigments on the surface of the writing paper/material and protective material for protection of the ink from infamnation and setting fire on the ink as it were mentioned above. But only these treatments do not satisfied to themselves. So they find out the means of the preservation of the ink. These are arranged because their land was frequcnted with fights and bites as well as rebellion and invasion. Not only these their soil is too acidic and the insects and termites are also in abundance because of the facts of the climatic condition of tropical zone.

Carefulness for treating preservations

The preservative materials employed by the Meitei in their traditional making of indigenous writing-ink are all collected and gathered from the resource-granary of the nature. So the typology of their preservative material is Nature cure or Natural preservative means of preservation with the help of natural materials.

Typology of the preservatives.

The preservatives are collected and gathered from the floral and mineral products so

Source of preservatives and their properties.

far concerned by the given preservatives. The most important preservative materials/substances are collected from Catechu-plant, called "KABO KHAJI" by the Meiteis in their dialect and blue vitriol called "NUNGSHIL ASHANGBA" in their tongue. The catechu fruit or spice obtained from its plant (Acacia catechu, sub-fem. Mimosoideae, fem. Leguminoseae) contained 'Tannin' abundantly. The tannin is provided as :—

Tannins — A class of complex organic compounds of vegetable origin. Compound consists of mixtures of derivatives of polyhydroxy benzoic acids : e. g. tannic acid.

(Alan Isaac & E. B. Uvarov, 1980, 418).

Tannic acid : A white amorphous solid, extracted from gall-nuts : it is a polymeric ester-type derivative of gallic acid and glucose used in tanning, as a mordant in dyeing, and ink manufacture (Ibid 417-18).

Gallic acid : trihydroxybenzoic acid, $C_6H_2(OH)_3COOH$. A yellowish crystalline substance, used in tanning and the manufacture of inks (Ibid, 439).

Tannin (tannic acid) : Substance that can precipitate gelatin of animal hides as an insoluble compound thus changing hide to leather which is now resistant to putrefaction, All tannins are obtained from plants and most are polyphenols. Common sources include Camellia -sinensis, Rhus, spp. and bark gallnuts of Quercus. (P. K. Garg & K. R. Srivastava, 1994, 416).

Tannin : A group of complex compounds cotaining phenols, hydroxy-acids or glucosides (George Usher, 1983, 369).

The tannic acid has the property of corossive/corossion. For neutralization of this corrosive property which will effect/affect on the paper as it can tan even the hide of animal Nungshil Ashangba (blue vitrol : Cupric sulphate : $CuSO_4 . 5H_2O$) is to be treated. This blue vatriol has also the property of Fungicite.

Blue vitriol, Blue Stone — Crystaline cupric sulphate $CuSo_4.5H_2O$. Used for copper plating and in solution for spraying plants.

(Alan Isaac & E. B. Uvarov, 1980, 50).

Cupric sulphate, Copper sulphate, blue vitriol, A blue crystalline soluble salt. Used as mordant, an insecticide and a fungicide - (Ibid, 103).

Fungicide — Chemical that kills fungi, used to prevent or cantrol pathogenic fungi, applied to seeds as dust or slurry and to standing crops as spray also or also to soil. Fungicide may be inorganic e. g. copper fungicide or organic as most modern one including a systemic fungicide see organicmercurial fungicide, dithio-carbonate fungicide. dinitro compounds, fumigant, seed dressing, quinone fungicide.

(P. K. Garg & K. P. Srivastava, 1994, 162)

Double functions of the preservative materials.

So blue vitriot kills and checks the growth and development of micro organisms, unicellular plants like fungi, alga, etc. Thus the treatment of the Meitei preservative material serve the double functions of protection against the harmful plants and preservation of the form of harming by eating and bitting of insects. It also serves as "Climatic and ecological medium of balancing in the equelibrium of temperature. moisture and humidity and seasonal and atmospheric change and alterations. Thus the Meitei indigenous traditional writing ink when compared and contested with the modern volatile and quick drying ink for durability, the indigenous ink beats the modern one which owed their colours to the organic compounds of iron (ferrum, Fe)

The Technique and Technology

Typology of the Technology of Meitei oriental styles of ink making Tradition.

The technique and technology of the preparation/making of the Meitei traditional writing ink in the oriental style as brought in Manipur by the eastern immigrants, the Nongpok Haram is in the typology of the oriental indigenous ink making tradition prevailed in the oriental or true east and far east countries like Myanmar, Thailand, etc. because they are habituated, in this technique and technology in their dyeing tradition, painting and drawing heritage. The technical and technological procedure go as —

Procedure No. 1 : Preparation of the raw materials.

The raw materials — i) the basic base material i. e. the bark of the taken species of the the tree/plant is cut into pieces at a length and breadth of about 10-12 cm. X 4-6 cm. or smaller because the more smaller the more quickness and the more advantage/facility will be obtained in the decomposition of the organic materials/substances in the soaking and extraction, emergence and driving out the relanin. The bark pieces are interned in a pot which can be used to boil.

Procedure No. 2 : Preparation of the Catalytic, material, its treatment & soaking.

The catalytic material, the Utti or the alkaloid solution was prepared previously as in the process stated above in the case of the paper-making is treated to the cut or crusted work barks in the pot so much so that the fluid/ solution finds at about the two third or three fourth of the total quantity.

After this the following procedure may be taken up either soaking or boiling procedure. For steadious and best quality of the ink the procedure of soaking in the alkaloid solution for about 12 to 20 hours is taken up. For quick and medium quality of ink the boiling procedure is taken up. Thus when the melanin or the substance of black/dark pigments are abundantly floated out and suspended in ihe solution the material is ready for the next procepure.

Procedure No. 3 : Sieving of the bark-pieces and treatment of adhesives.

The pot which contains the preparing materials of the ink and is set either to soak elsewhere in a corner of the house/building or to boil on fire is taken to sieve off the bark-pieces. A piece of cloth or thin towel with folded twice is kept over the mouth of another pot of the same size. The contains of the original pot is poured over the piece of cloth on the mouth of another pot. The solution is sifted through the cloth-sieve separating the insoluble solid, bark-pieces etc. leaving them on the cloth sieve and liquid/solute in which the melanin is dissolved. The liquid/solution is collected in the receiving pot on chich the cloth-sieve is fitted, Then the adhesive material is added either in solid or liquid state or glue.

Procecure No 4 : Boiling and treating with sticking/attaching gun or Cha.

Fire is kindled up and made it ablaze. The liquid/solution containing pot is set on fire to boil so as to mellow the treating material to enter into its glue state. Then it is to add/treat with gum/lac/lacquer/resit. If the liquid is evaporated too much fresh or boiled water is to be added to find its condition.

Procedure No. 5 : Boiling continued and protective material is treated.

When the solution gets its well boiling temparature after the addition of new fresh or boiled water the protective material is treated but the boiling is continued by adding new water if necessary to keep the normality of the ink in its condition of that stage.

Procedure No. 6 : Treatment of the preservative materials.

The preservative material is treated on the last stage as the salt, the preservative substance of the curry is treated by the Meitei at about the closing of the preparation. At this stage the state of the ink for its liquidity will be observed minutely. When the stage of riping is attained, that is, all the treated auxilary materials are appeared to dissolve well in the liquid to form a uniform solution, the boiling is to stop and the whole is set down to cool at a place of worthy.

Procedure No. 7 : Filtering and receiving.

When the solution or the ink is cooled enough the unwanted insoluble substances are to be found as settled down sediments at the bottom. By this time also the process of filtration or sifting through a sieve of cloth is to be undertaken.

Dying out or unpopularity of this process :

When the last stage/procedure of filtration is finished the liquid/solution becomes the writing ink. This process of technical and technological typology of making indigenous ink in oriental style of tradition seems to be unpopular and unfavourable to the Meiteis. It is because of the socic-economical facts that almost all the materials employed in the style of this tradition were/are the materials for dyeing. And the specified species (like lacquer tree, Khutchum pere, etc.) of valuable trees/plants were/are also not so abundantly found in among the forest and outdoor products of Manipur. So they were used to the more essential purposes i. e. the dyeing of cloths of silk and fine cotten fabric as well as important cloths like — KUMCHINBI PHANEK (ladies valuable loin dress), Ningthouphi (precicus robes/shirts/shwals of nobles, royal family personnels, etc.) KHAMU/KHAMEN CHAPPA (Meitei's traditional colourful clothes) etc. so for economics sake this process of method was avoided and died out and the another process of economical values was/is taken up popularly.

ECONOMIC
CAUSE TO
AVOID

B) Western Fashion of Ink-making.

The western fashion of traditional ink-making adopted by the Meitei is seemed to have been originated as an import from Shrihasta/Shrihatta/Silhet, the capital city of old kingdom of Kamata and the city was known to the Meitei of 16th-18th centuries as PASHA (CHENGLEIRON script. MS$_6$). The city being a highly developed educational centre prior to the rise of Nabadwipa in Nadjaya district of present West Bengal state. It was also a trade centre in the ancient and medieval historical period of North-Eastern India (R. B. Pemberton,)

Origin of the western fashion of Ink-making

The craft of western fashion of ink-making tradition was probablely brought in Manipur by the Hindu immigrants during the second half of the Muslim supermacy in India (C, 1160-1760 AD : R. C, Majumdar, 1979, 63-183). The Hindus of those who did not want to lose their religious faith against the Muslim tortures of adopting and initiating into the refined Judian religious new laws and gospels, migrated horde after horde towards the land of sunrise and crowded in the then north eastern region. Some of them further advanced towards and in this natural fort of hills and hilly ranges. (Bamon Meihoubarol Script, MS). As they

Entrance of the Craft in Manipur.

were the bookworms and patrone of writing they brought in the art of Indian writing tradition of Brahmi/Devanagiri script and the craft of making the writing equipment after habitation at different places of the then Goura/Banga/Bangal/Bengal. Thus the unknown or anonymous Hindu immigrant/immigrants were/are responsible for bringing in and introducing the craft of handmade ink-making tradition in Manipur and the tradition was appeared to endure until the last war of independence of Manipur, 1891 when the British paramouncy in India was extended over the land and reduced independent sovereign kingdom of Manipur to the status of a dependent colonial state of British Indian empire.

Actual life of the craft of the Handmade ink-making tradition.

Resource of essential textural fabrics

The resource of the essential textural fabrics as it were mentioned in the case of the oriental tradition of handmade ink-making craft was the natural resource. The essential materials were collected from the floral, faunal and mineral sources. These materials could be collected

Resource of the textural fabrics

either in the form of organic or inorganic substances, The floral/founal/mineral sources are collected as plant/animal/rock or salt or their remains. The textural fabrics have the same division but somewhat different and sub-divisions as it were done in the above described case of the oriental style of tradition.

1) Basic base/foundation-materials for collection of the textural fabrics.

Plants for extraction of the basic base textural fabrics.

For the case of the basic base/foundation materials it is habitual for the Meitei to depend upon the natural vegetation and floral produces, and they are mostly the plants. Some of the important plants under the classification of the herbs, shrubs and trees are i) HANGAM PAMBI (Mustard Plant : Brassica competris, s fem. Cruciferae), ii) THOIDING AMUBA and ANGOUBA (Sesame, black and white : Sesamum indicum/orientale and Perill ocimoides, fem. Pedaliaceae) iii) YUBI (Coco plam : Cocos nucifera, fem. Palmae) iv) KEGE (Angouba or Chumnagi : Castor : Ricinus communis fem. Euphorbeaceae), v) KEGE ANGANGBA (Ricinus sp. fem. Euphorbeaceae), vi) AWA KEGE (Jatrophacurcas, fem. Euphorbeaceae), vii) TINSHIBI (Linseed : Linum sps. fem, Papilionaceae) and viii) UCHAN (Pine : Hydrocarpus Khurjii, fem. Flacourtiaceae). The above first seven (Nos. 1-7) are to be collected their fruits from which the seeds are to be used to extract oils as they are known for the same as oil-seeds. The oils or one of the oil, is to be employed for collection of textural fabric of the ink, The last one (No. 8) is to be used of its resinous wood for colleclion of the textural fabric of the ink-making tradition. Among these plants the Meitei prefers and familiar with the Mustard plant as it is abundantly available in its season (winter) But the Pine is in the service of man through out the year in Manipur.

Part/Parts of the plant to be collected for use of extraction of textural fabrics of ink.

Collection/extraction of textural fabric from the plant-parts for basic base material.

Typology of the textural fabric.

The textural fabric used in handmade ink-making tradition as basic base/foundation-material is the lamp-black or the soot of the fire which is called by the Meitei as "TENGGALI" a corrupted derivative of "TEL KATI " meaning the black of the "tel ", a Hindi word denoting oil. As the lamp-black means —

> " Soot from a lamp, or from the burning of bodies rich in carbon (mineral oil, turpentine, tar, etc.) in a limited supply of air; a pigment made from it. "
>
> (Catherine Schwarz & Others, 1990,801)

And soot means — a black deposit from imperfect combustion of carbonaceous matter : a smut, it is nothing other than the remains of carbon that means carbon itself. So the actual typology of the basic base material and its textural fabric is carbon. Carbon is given as :—
Carbon, C. Element A. W. 12.011, At. No. 6 m. p. 355 0°C. It occurs in several allotropic forms including diamond (r. d. 3.51) and graphite (r. d. 2. 25) , and as amorphous carbon (r. d. 1. 8 - 2,1) in some forms of lampblack, gas carbon etc. compounds occurs ……
…………) (Alan Isaac & E. B. Uvarov 1980, 63)

The collection of the lamp-black or soot needs some equipments and procedure for both seed-use and trunk or wood/use cases. The processs and procedures are describing under in separate cases respectively.

I) Process & Procecures of Seed-use :

The seeds are collected and the oil is extracted from the taken kind, say mustard seeds.

For the case of mustard seed no special arrangement for pounding the seeds upto the formation of the kernel-paste of the seed, and then squeezing and pressuring by hands or some other means for the extraction of the oil was not needed from the regime of His-divinity -king Khagemba (1597-1652 A. D.). By this time the people of the western imigrant ethnic group introduced to extract mustard seed-oil by using the oil-seed crushing wooden crusher/machine worked or toiled by bull/ox for the man-power (Nongchup Haramlon, Script - II ; Khetrilon script, M. Ss.). So the mustard seed as sent to the oil-extraction-complex for obtaining the essential oil for the purpose,

Extraction of oil from Seeds.

Then an oil container for making an oil-lamp and its wick is needed. It is to aware that the process is for collection of the lamp-black as so the wick must be of somewhat big size so as to produce large flames to yield soots quickly, abundantly and steadily, when the necessary equipments are in hand, the oil is poured in the pot which will be the oil-tank of the lamp and the wick is also fitted. Now everything is ready for the next procedure.

A big jar/pitcher is taken near or in the place/room where the process of soot is to smudge up inside the jar. Then the vegetable oil-lamp is lighted up and it will be covered with the inverted jar in such a way that the flame of the light is nearly to touch the inner surface of the jar. Again it must be careful to incline/slant the mouth of jar with supports on the surface so as there will be a passage of the air. The sooting will take at least eight hours to twelve hours so as to find the enough deposit-stain of the soot or lamp-black. After finding enough quantity of the soot the jar is taken out and the light/lamp is put off.

The lamp-black or deposited stained/smudged soot is to be collected from the inner surface of the jar. It will be better and safe to use a blade edged knife or instrument to collect the lamp-black from the jar.

II) Process and procedures of wood-use.

The pine-wood is collected from the general market or elsewhere. The wood is then cut into the pieces at about the length of 20-25 c.m, the breadth of 4-6/7 c. m. and 0.5-1.5 c. m. in thickness and then made ready to take in the jar and to kindle a piece of the pine-wood/stick. When the pine piece/stick is lighted up the jar is covered over it as it is done in the above case. The whole process and procedures are same except the way of burning the pinesticks one by one. So care for the continual burning is needed so as not to take much time. Thus the lamp-black is collected from the pine wood.

2) Basic base/foundation fluid/liquid :

In the case of the western fashion of traditional making of writing ink has a basic base/foundation/fluid/liquid as the textural fabric of the basic base material is to use in solid powdered state. The material of the fluid/liquid is also to obtain from the floral produce. The material may be collected from all the plants which are named as the plants for availing substances or carbohydrates of glue formation. Such plants are — i) Paddy /rice, ii) Maize, iii) Millet, iv) Wheat, v) Potato, vi) Sweet potato (U-mangra) and vii) Ha (Yam : Dioscorea sativa fem. Dioscoreaceae). But the Meitei are better to use by paddy plant product i. e. rice (Oryza sativa, sub-fem. Poaceae, fem. Graminae) because as it is the principle food of the Manipuris it found abundantly and cheaply everywhere in Manipur.

Plants for collection of basic foundation fluid.

The corn of this cereal is in the utility of the basic foundation fluid. The rice is pounded finely. It is better to find its finess up to the state of finest flour because it is to be treated in raw (uncooked) in the preparation of the fluid which will receive the textural fabric directly. For the preparation of the fluid the fine particles of the rice are treated in the water containing in a pot or vessel/receptacle. It is to be soaked for some times so as to wet throughly so that the albumenous carbohydrates containing in the organic substance of the rice may be enabled to decompose and float out. After soaking for about half an hour the rice -water is probable to get some whitish colour which is called by the Meitei as CHENG-HI (rice-water). The lamp-black or the soot is treated to basic base fluid/solution of rice-water. The lamp-black is to be crumbled with the fingers and stir and agitate again and again until it has an uniform mixture of the rice-water and the lamp-black. Thus the actual basic base textural fabric is made.

Preparation of the basid-base fluid.

Preparation of actual basic base textural -fabric.

3) Catalytic material/mordant

The catalytic material or the mordant employed in this process of the western fashion of handmade writing-ink making tradition is also same as given above in the case of Eastern style of making tradition. In this process also the most wanted textural fabric or mordant is extracted from the ash-solution or alkaloid solution of Khutchum pere (Achyranthus aspera, fem. Amaranthaceae).

4) Adhesive material

In this case, the glue treatment has already been employed in forming the basic-base fluid. So it must be dropped, The treatment of gums or lac or lacquer will be done with the same substances as provided in the oriental style of ink making tradition. The functions and specimen of substances and the species of the plants are also in the same utilities in this case as stated above.

5) Protective materials and

6) Preservative materials.

Both the materials of protection and preservation have the same and similar materials, species of floral, founal and mineral products in prescription, For this two materials the employment and utilization of Nungshil (Alum), Nungshil Ashangba (Blue Vitriol or copper sulphate), Catechu (Acacia catechu, sub-fem. Mimoceae, fem, Leguminosae) etc. are treated in the same fashion and procedure. But the additional material mentioned here is the utilization of LUPA HIDAK (Borax) as the protective and preservative material.

Borax (Disodium tetraborate-10-water: $Na_2B_40_7IOH_2O$). A white crystaline solid, sparingly soluble in cold water but readily soluble in hot water. It occurs naturally as salt deposits in dry lake beds, espicially in California. It is an important industrial material, being used in the manufacture of enamels, and heat resistant glass, as a paper glaze, etc.

(John Dainlith, 1981, 70)

Sodium tetraborate (correctly, disodium tetraborate)

Borax sodium biborate sodium pyroborate $Na_2B_40_7.IOH_2O$): A white soluble crystaline salt, occuring naturally as tincal. On heating it loses water of crystalization and melts to a clear glass-liks solid .... Used as an antiseplic, in fireproofing, as a flux and in the manufacture of glass and ceramics. (Alan Isaac & E. B. Uvorob, 390).

Technique and technology

The technique and technology of the Meitei handmade. ink-making tradition is western fashion as brought in by the western immigrants

Typology of the technology of Meitei western fashion of ink-making tradition.

the Nongchup Haram is in the typology of Bengal indigenous ink-making tradition endured in the north eastern Bengal/Bangladesh espicially prevailed in the ancient city of Shrihatta or Silhet as the Meitei traditional extraction of rock-salt from the salt-spring was in the typology of Silhet tradition of salt extraction (T. C. Hodson, 1981, 35) in matter of fueling system of Silhet salt-kiln.

The Process and Procedures

The process and procedures of the technology for western fashion of Meitei ink-making tradition are not differed much from that of the oriental style of ink-making tradition. The process and procedure go as under in brief :

i) Preparation of the basic base materials as shown above.

ii) Preparation of the basic foundation fluid or solution and adding both the material solid substance i, e, lamp-black and the foundation liquid to complete the preparation of the basic base material of this western tradition.

iii) Treatment of the catalytic materials or the substances of the mordant.

iv) Treatment of the substances of the adhesive materials-the gum/lac/lacquer.

At this stage it is to keep in mind that the lac is slightly soluble and the lacquer if it is to be employed is insoluble in cold water but readily soluble in hot water. So furnance is to be made ready for disolution of the treating substance because it is highly essential for ink-making as it perform the treta function of the adhesion, protection, preservation and lustrous /luminous effect on the surface of the ink. Therefore the solution is to be boiled to dissolve the substances.

v) Treatment of the protective materials.

vi) Treatment of the preservative materials and boiled upto the mark of ripeness.

vii) Setting down from the fire and given to be cooled down and sifted the liquid through a cloth-sieve to find the final black liquid/ink.

From the above facts and finds of the ink-making tradition for both the oriental style and the western fashion it is observed that both the tradition employed the boiling technique in the technology. The boiling technique not only assist in the forming a regular and uniform mixture of all the substance taken as the raw material but also help in diffusion and compounding of the substances treated for being the components and constituent of the ink. When it attains its finishing stage if there be additional liquidity it is to be evaporated to drive away the liquidity in the state of the gas. Thus it is to be obtained as a writing liquid/solution called the ink.

Another Model of Technology of Meitei Ink-making Tradition (A modern write up in archaic classicism).

No one but a modern single scholar put forth one of the traditional fashion of Meitei ink-making process of his time from customary oral preservation to the black and white. It is a writing in the shortest gist but a mark of antiquity of the Meitei tradition to this effect. His write-up is transcreated into English from his own lingual writing hereunder.

The writing ink was not imported/purchased from the outside countries in olden days. The ink was also made by the people of this land. It is known as Meitei muk or Meitei ink. The ink which is selling in shops and filling in the fountain pen at present is not so nice and durable if it is to write on the Meitei hand made paper and Agarbak (wooden-strip-board). If it is written with Meitei handmade ink there are luminosity as well as durability and beauty. The lac (the encrusted resins on the twigs and branches of plants), lamp-black and rice are primarily used in the making of the Meitei ink ... (N. Khelchandra, 1969, 27)

In an alkaloid obtained as a sifted solution through an ash-sieve or in some normal water, treated with some pieces of solid alkali is added with the wood-twig encrusted resin/lac and the whole is boiled on fire.

Some rice is fried on another vessel like pan upto the state of scorch and treated to the solution of lac. Then the liquid is boiled for sometime and sifted through a cloth-sieve.

To this sifted solution some lumps of lamp-black is treated in process of making cooked rice glue or rice-starch-water by squeezing and crumbling the cloth-covering rice-ball with palms and fingers.

The ink made in such a way is fit to use for general utility. Such made inks are used to frost and if boiled again for liquidity it is curdled wiih encrustation of curd on the surface of the ink. So at the time when the lamp-black is treated it is to be crushed with hard rubbing and squeezing again and agasn by the hard seed of costus specious creeper (Kang-khil) for its complete dissolution in the liquid. (Ibid, 32)

From the above write-up it is brought to light that the technology dislayed by this modern scholar is in the typological jurisdiction of the western fashion of ink-making tradition. This makes to understand that the tradition subsided the oriental style of ink-making tradition.

The Reeeptacle of Ink :

The Meitei "Kali" or Muk (ink) as it were made in liquid state needs a receptacle for it. The Meitei use to stock and keep for it in separate earthenware pots. Both of them are known to the Meitei as "Kaliphu" or 'Mukphu" meaning directly in transliterated form of inkpot. For daily or routine use pot was smaller in size of the same shape of globular body or elliptical shape when a ring foot was attached but foot/stand were seldom provided for those which were made into the shape of a bell. These were made with clay or terracotta and baked by firing as pots. These pots were engaged to potter or sometimes the potter pottered themselves with his own intentions or on his own accords. Thus the inkpot in Manipur were available in the pottery complexes of the country prior to the imported glass inkpot. The importion of glass made articles and inkpots are probable to start during the regime of Maharaja Ningthem Pishak (Chandrakirti Singh 1834-44 A. D.) as the royal chronicle provided as " to bring in .... a mirror as broad as Yangkok (Winnow : about 60 to 65 cm. in diameter) and a clock (Ghari) from the western land (British dominion or India) on Monday the Newmoon (30th of closing lunar month's) day of Meitei lunar month of Langban (Sept.--Oct.) in 1761 Saka (1839 A. D.) (Ibungohal & Khelchandra, 1989 251)" . Thus the Meitei tried to stand on there own legs during the days of yore.

MEITEI TRADITIONAL WRITING INSTRUMENT

Introduction : What is it ?

The Meitei, as being one of the annals record-keepers of the world are habituated in writing and using/keeping a writing instrument for these recording is a habitual fact. Primitive writing instruments were sometimes faded away or sometimes turned into traditional instruments until the invention and introduction of new ones made up of various durable and undurable textures. It is appeared to denote the writing instrument by "Quill". in English prior to the word "pen". This statement is pleaded by the meaning of "Quill" as .... a goose or other feather used as a pen : hence a pen generally, or the profession of letters".

(Catherine Schwarz, George Davison & other two, 1990, 1204). in which the "pen" means for a large feather : …… .. … a quill ………… .. an instrument use for writing (with ink or otherwise), formerly made of a quill, but now of other materials, a nib : a nib with a holder (Ibid, 1070). As change and alteration, are the rules/laws of civilization the convenient and facilitated material/texture of the instrument may be changed but the purpose and the utility remain the same. So the Meitei traditional writing instrument though crude and indigenous in any sort, had served their purposes.

Quill, the feather denotes the pen

Nomenclature

The Meitei writing instrument or pen is called by the Meitei in there native tongue as **KHORJEI** a corrupt word of **KHORCHEI/KHORCHAI** a derivative of the joint or compound word from the two words "KHORI" (a scribed mark, a scratch, dull and uneasy drawing/painting/writing etc. mark : to write, to draw, to scratch, etc). and CHEI/CHAI (n. a. stick, a handle, an equipment, an instrument, a tool, a weapon, an impliment) means a writing instrument i. e, a pen. But after sometime as the holder/user/writer of the instrument for royal/public transection were being mainly of Bengali ethnic people i. e. Lairikyengbas/Lairikyengbams (Masin script. Sang Panba Pumnamakki Masin script. MSs. etc) the Bengali lingual word "KALAM" pronounced by them as KOLOM (Mittal publication. 1983, 183) was adopted by as it were their tongue and the Meitei adopted and made to effect the word, "Kolom" into their tradition.

Origin of the Instrument : From where the first ?

Origin of Universal writing-instruments

As it were the convention of the world that writing instrument was emerged out with the writing itself and as the necessity is the mother of invention the instruments change according to the needs and necessities. When paper was invented paper-writing and paper-writer instruments were automatically produced. Thus from scriber to the modern pen comes by changing their textural material from floral and founal products to mineral and synthetic materials.

Origin of the Meitei writing instrument.

The Meitei writing art being started nominally during the regime of Meitei lord Kiyamba (1467-1508 A. D.) after his foreign cultural exchange in 1470 A. D. (Ibungohal & Khelchandra, 1989, 19-20 ; Sorarel Macha Khunkumba script. Nongpok Haramlon script. M.Ss.) the utilization of the writing instrument was probable to start at the same time evenwhen the formal writing started during the paramouncy of His divinity King Khagemba (1597-1652 A. D.) in 1616 A. D. (Ibid, 36). Therefore the eighth decayed of the 15th century may be presumed as the date of origin of the Meitei writing instrument.

Typology of Meitei Writing Instrument : Which ?

From the above mentioned fact of origin of the Meitei Writing instrument it brought to light that the first entered writing in Manipur was in the style and typology of oriental writing tradition. The western Aryan or Dravida -Aryan-Himalayan style and typology of Banga-Goura-Bengali writing tradition encroached in Manipur after 44/45 years i, e. in 1514 A. D (Ibid, 22 ; Nongchup Haramlon script, Nongchup Haram script, and Lairikyengbamlon script, M. Ss.). So both the typologies and styles were mixed up into the soil of the brain of the Meiteis.

But as in the universal theme both the writing traditions used the floral and founal produces as the material textures of writing surface, colour liquid/juice/fluid/ink and marking / lettering instrument, the typology of the Meitei writing instrument/pen was also of the floral and founal typology. It is in the principle of the international theme of the indigenous or primitive pens of all the nations of the world. As the scientific civilization differentiated the standard of the art of writings and their requirements the Meiteis who were/are in uncommunicatable area of natural hill fort could not touch the world of civilixation until the one-third of the world conquerer, the British touched the soil of Manipur. But they were using their bamboo-made pen uptil 1891. A. D. when their land entered into the British Asian Empire.

floral and founal produce-typologies

Textural Material/Fabric : What & Where ?

Natural Resource as the sources.

The textural materials or fabric of the Meitei writing instrument as aforesaid above in the typology were the floral and founal produces, They procured the materials from the wild or domesticated hill or plain forest and bower/arbour/grove woods or fields as the natural resources. Thus woods and forest became the sources of both the floral and founal produces. So the textural materials of the Meitei writing instrument may be divided into the floral material e. i. bamboo made instrument and founal material e. i. feather made pen. But the Meitei delighted much with the floral material pens as they adopted an orthodox Hinduism since 1704 A.D.

Floral materials

The floral materials as prescribed by the elders were the bamboos. There are about twenty five species of bamboos in Manipur. All the bamboo species are appeared in Gramineae femily and termed as— i) SANEIBI (Bambusa arudinaceae, ii) WATANGKHOI (B. nutans), iii) LAIWA (B. pallidrum), iv) UTANG (B. tulda), v) WANAN (Dendrocalamus brandisii) vi) MARIBOP (D. gigantus), vii) MOUBIWA (Melocana bambusa), viii) Dondrocalamus hookeri, ix) D. hamiltonil, x) Bambusa vulgaris, xi) B. Balcocooa, xii) B. Khasiana, xiii) B. balcopa, xiv) B. kingiana, xv) Cephalostachyum - lati folium , xvi) C. capitatum, xvii) C. pergracile, xviii) Pseudostachyum polymorphum (LANGCHAK-WA etc. (L. Dhabati Devi,) could made the writing instrument. Among these species the most popular one was/is Saneibi and other followers were/are Laiwa. Utang, Langchakwa, Wanan, etc. As the most abundant and cheap as well as for quality-product and longivity the Saneibi (Bambusa arundinaceae) was specially reserved for pen making.

Species of bamboo most popular for pen

Even in Saneibi species the material/textural qualifications are provided as — i) it must be an old aged one and ii) Even the Saneibi be in enough old age it must have the symptom of red hue produces on its outer surface of exoxylem of the stem internodes (Khelchandra, 1969 32).

Qualification of Saneibi sp. for making writing instrument

Reeds such as SINGUT (Common/fencing reed : probably of genus Phragmites), SINGNANG (Sacharum procerum) , TOU (another sp. of water-reed), WASA (branches of bamboo), etc. could also be made for unhandy pens.

KAMENG plant for making Meitei pen

Another floral plant provided by the elders for making Meitei traditional writing instrument was KAMENG plant. The plant is not yet identified botanically but it is given as — "a small plant which can be used as pen when mended". (N. Khelchandra, 1964, 73). This has tubular cylindrican stem and is probable to be a woody Asterales plant. But the Meitei were prefered to handle the bamboo made pens. It is remarked by an international scholar as —

The M Ss. (Manuscripts) are written on a course, but very durable kind of paper, with pens made of bamboo ; paper blackened with charcoal on which they write a soapstone pencil is also used. "

(G. A. Grierson, D. Litt, 1904, 21)

Founal Materirls

Fowls Birds

The founal material as described by scholars of yore are the feather or quill of birds found in the jurisdiction of the lost kingdom of Manipur. The birds which were popular for feathers are the domestic fowls like cocks and hens, drakes and ducks and genders and gooses as well as wild fowls, are seasonal wild ducks as — i) Pochard (Nganu Eruppi), ii) Shovellar (Nganu Khara : Saptula clypeata), iii) Garganey or blue winged teal (Nganu Kherelaubi : Querquedula guerquedula), iv) Ruddy sheldrake or Brahminy duck (Nganu thanggong : Casarca ferruginea), v) Wigeon (Nganu thangognman : Mareca penelope), vi) Gadwall (Nganuthoidingnam : Chaulelasmus streperus), vii) Spot bill or grey duck (Nganu piren : Anas poecilorhyncha), viii) Cotton teal (Nganu pedek : Nettapus coromendelianus), ix) Pintai (Nganu meitungnga : Dafila acuta acuta), x) Common teal (Nganu Leingangchabi :Surit : Nettion crecca crecca), etc. , egrets and herons like — i) The little egret (urok naukang : Egretta garzetta garzetta), ii) Indian pond heron (Urok lampra : Ardeola grayii), iii) The Chinese pond heron (Urok lampra Amubi : Ardeola bacchus) iv) Indian smaller egret (Urok Langkhongsang : Egretta intermedia intermedia) , v) the eastern large egret (Urok Loklenba : Egretta alba modesta), vi) Cattle egret (Urok shandung-in : Bubulcus ibis coromandus), vii) Cormorant (Ura), viii) The Indian shag (Ura okman : Phala crocorax fascicollis), ix) the little cormorant (Ura Khomdon : Phala crocorax niger), x) The large Indian cormorant (Phala corcorax carbo sinensis), xi) Green eye cormorant. xii) The Indian Darter (Anhinga melanogaster), xiii) Heron (Ushai), xiv) The eastern purple heron (Ushai shaingang : Ardea purpurea manillensia, xv) The eastern grey heron (Ardea cinerea rectirostris), xvi) Uchek Langmeidong (Buceros bicornis, fem. Burcerotidae), xvii) Peacock (Pavo cristatus), xviii) Pheasant (Phasianus colchicus), etc. Among these the favorite feathers are, Urekshek (the feather of egrets & herons), Langmei or Langmeipunglen (the feather or the quill of the

Buceros Sps.), Noiningkhoi (feather of pheasant), Yendu (feather of cocks and hens) and Wahong matu (quill feather of peacock). Among these the most wanted quill or feather for making pens are LANGMEI, WAHONG MATU and YENDU even though all the quill or feathers of the birds can be mended for using as writing instrument. Again the Meitei are most usually habituated to make pens by the spines of procupine or SHABOU (Hystrix indica fem. Hystricidae). The animal is abundantly found in Manipur and its spines could be collected by Meitei hunters.

Reknown feather birds

Most wanted for Pen making.

SHBOU QUILL (Porcupine spine)

For the textural material of both the floral and founal produces is referring to a quotation of direct transcreation from the Matipuri as "Pen for writing isused of bamboo-made pen. For making bamboo-pen an old age Saneibi bamboo which exhibits red colour at the outer surface of the internodes of the stem which is stripped into pieces, is used as the best one. The stem of Kameng plant or the feather of birds can make pen instead of the bamboo strip". (N. Khelchandra, 1969. 32).

Technology of Meitei writing Instrument/Pen

Tools for caring a writing instrument

The Meitei writing instrument is of a single and primitive style. For making or mending the floral textural materials a Sanggai (a long handled dagger with short portion of iron blade will do and for the founal material a scissor and a knife will served the purposes. As the Meitei did not use iron or metal nibs in their pens, the holder with a pointed or tappering point will be the shape and form of the pen. The technology of mending pen goes as —

Bamboo-pen making in Meitei technology

The bamboo, as described above, is cut into strips at about size 1.5 ×1.5×length cu. cm. Again the strips are cut at a length of about 15 to 20 cm. leaving out the nodes of the stem select two or three pieces of well proportion of thickness, breadth and length. Then let them dry, until they get their stiff. Use the Sanggai (dagger) to mend the bamboo strip-piece ino a small solid cylinder of about 15 to 18 cm. in length with the diameter of about 1 to 1.25 cm. Tapering the both ends is taken up one for style and handiness of the pen to make its tail or anterior end. It is to bear in mind that posterior or bottom or foot-side of the stem/stalk/rib will always be made into the nib-side or the nib-point of the pen. Then the nib-point is to be carved in tappering until it finds the wanted size of about 0.005 to 0.01 m.m. in diameter. Now the mended piece can be use as a pen.

Kameng-pen Making in Meitei Technology

The stalk or stem of Kameng is collected elsewere. Then its branches, leaves, buds, etc. are cleared of with the knife. It is to make dry into the sun or in shade. When it is dry enough cut the stem into the required size with nodes and internodes or elsewhat its state of affairs. As the stem is tubular the nib is to be made by tappering the end of the nib-point on one side only. Such style and technology of making pen with the textures of reeds and bamboo-branch are to be employed. It is required to mend the nib of the pen from time to time. Kameng made pen was more preferable to bamboo made ones but as the texture or plant was not as abundance as the bamboo in their availabilities bamboo-made pen became more popular in among the Meiter writers.

The ribs of feather or feather of birds and spines of procupine were collected from the hill or plain woods and lakes or domesticate and reserved village groves and arbours as aforesaid. These textures need only to mend the nib-point.

Feather and spine-pen making in Meiter Technology

As the basal rib of the feather and the spine piece are in hollow and empty inside and form a tubular space inside the rib and basal part or spine, the technology to be employed for making pen are similar to that of the Kemeng. But it must be careful enough as the texture is more flexible and tensible than the stem of Kameng or reed.

Testification of Durabilities

Meitei handmade paper and ink have their own durabilities more than the modern machine-made general papers and inks. The durability of the Meitei paper is described by Dr. G. A. Grierson, C. I. E, ph. D., D. Litt., I.C.S in his reknown work "The Liguistic Survey of India Vol. III part III (London 1904) : p. 21 as shown in the above quotation of his statement. But it can also be tested for one's satisfaction in a single domestic experiment. The ink also has the same fate on Testification. The experiments go as belows :

For Handmade paper

Please take two sheets of paper one for

Meitei Handmade paper and the other for modern paper about the sizes those can fully cover on the electric bulbs.

Fit two electric bulbs of one hundred voltages and one hundred watts on a domestic or experimental holders. Please cover the sheets to each of them and fasten the ends at the holders with threads. Then the electric current is circulated by switch altering connection of the breaking contact of the circuit. Keep them so long as to bake in the heat of the bulbs until the papers are char or score or blaken with the heat and the light produced by the bulbs. Please see which one becomes char first at the baking. It is sure-that the modern paper will do it first. This experiment may take one or two hours but never mind it is doing in the glory of Meitei cultural heritage.

For Handmade/Indigenous Ink.

Please take a tub of water and soak two broad sheets os paper written one with Meitei ink and the other with modern ink. Please let it be soak for at lease half an hour and shake the paper with equal counts inside the water at least 25 to 50. Then please take out the papers quicker and see which one has the clear black hue on the papers. It is sure that Meitei-ink written paper will show its activity of durability as it is effected with adhesive material.

CONCLUSION

From the above facts of the technologies of the Meitei handmade paper, ink and pen traditions it is observed that the Meitei even though they were in the uncommunicated ravine-world could suck the nectar of the art of writing with production of their own craft and handicraft. They are the preservers of ancient/medieval/modern records in less durable and perishable textures as well as some textures of unperishable textures like Copper, iron bronze-plates, as well as some lime stone textures. For scribing and carving on metals and rocks they used metal instruments like points, chisels, hammers, etc.

But these were not of daily routine works but ocassional and commemorative celebrations, commemoration, events, etc. So for daily or frequent transections of private or public, state or domestic, governmental or personal as well as social or individual record keeping or expression of thoughts and ideas were made on the handmade paper with its equipments. But the traditions of their making has been dying with the suffocating smoke of the machines which manufactured the modern writing materials and equipments. Therefore to keep bird's eye views on the subjects today are highly essential for the modern generation.

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২। চরিক পরেং (নোভেল : ১৯৬৯)
৩। য়ুগী পাত্রদা তশবীর (নোভেল : ১৯৭০)
৪। খুমন নিংথৌরোল লম্বুবা (পূয়া : ১৯৮৯)
৫। থাঙমইরোল (পুয়া : ১৯৮৯)
৬। সনামহি পুয়া (পুয়া : ১৯৮৯)
৭। মৈতৈ পাংঙল হৌরকফম (থিজিন হুমজিনবা : ১৯৯১)
৮। মৈতৈ বামোন হৌরকফম (থিজিন হুমজিনবা ঃ ১৯৯১)
৯। মনিপুরগী নুঙগী চক্তা লৈরম্বা মীশিং (ওন আকিওলোজিকেল রিসার্চ ১৯৯৬)
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